3 - Service Software Instructions

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Table of Contents

Page No

Service Software 4
Phoenix 4
Supported Operating Systems 4
Hardware requirements for using Phoenix 4
Introduction 4
Starting a session 6
SW Update Flashing Setup 8
FPS-8 Flash setup 8
POS Flash concept 9
Module Jig Flash concept 10
RH-29 Phoenix installation instructions 10
FPS-8 to PC connection Setup instructions 11
FPS-8 activation 11
Checking Application SW version inside FPS-8 11
SW update / Re-Flashing setups 13
POS Setup with FLS-4S Adapter 13
DA-17 flash setup 14
DA-17 SW update setup 14
Other setups 15
Flashing 16
Data package installation 19
Reprogramming RH-29 20
Connecting cables 20
Proceed as follows: 20
Settings backup/restore 20
Updating software 21
Formatting user area 22
Restore settings 22
Energy Management Calibration 23
Connections 23
Phoenix setup 23
Calibration 23
ZOCUS calibration 24
Phoenix Tuning 26
RF tuning after repairs 26
RX channel select filter calibration 26
RX calibration (incl. VCXO Calibration) 27
RX AGC limits 32
RX band filter response compensation 32
TX I/Q tuning 37
TX power tuning 48
Bit Error Rate Testing with JBT-9 52
Hardware needed to use JBT-9 52
Use of JBT-9 stand-alone 52
Attenuation settings 52
Performing BER test 52
Testing instructions for BER testing 54

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Additional menu functions 55
Attenuation setting via jumper 56
LED indication of JBT-9 56
JBT-9 Firmware Upgrade 57

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Service Software

Phoenix

Phoenix is the new generation Service Software. It has been designed to meet the challenges in servicing modern cellular phone technology.

The Phoenix program has been built using component architecture. This means that the actual program is small and most of the program's functionality is divided into dynamically loaded modules (DLLs).

Supported Operating Systems

Windows 98, 2000, ME and NT 4.0 (SP4).

Hardware requirements for using Phoenix

Minimum:
Processor 233 MHz, RAM memory 64 MB, Disk space 50-100 MB.

Recommended for Windows 2000:
Processor 700 MHz, RAM memory 512 MB, Disk space 50-100 MB.

Introduction

This section briefly describes how to install the Phoenix software and includes some basic information on how to use the program. For more detailed information, please refer to Phoenix's **Help -files**. Each feature in Phoenix has its own Help function, which can be activated while running the program.

Press the *F1* key or the feature's Help-button to activate a Help -file.

Installing Phoenix

1. Download the latest release. Please contact your regional After Market Services point for information on where to download the latest release.

Download and read the release notes, which have useful information on the software version you are using.

2. Download the latest data packages for the products you will be using.

3. Before you start installing the program, check that

- the dongle is attached to parallel port. Contact your supervisor in order to obtain a suitable dongle.

- you have administrator rights (Windows 2000 or NT only). This is required in order to be able to install Phoenix.

4. Install Phoenix by executing the Phoenix installation package and follow the instruc-

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tions on the screen.

Initially the setup files are extracted into the file system.

Note: If the setup files are already extracted (left in the file system from previous installation) "Overwrite Protection" dialog appears. Always click "Yes to All" to overwrite the existing setup files.

5. The installation checks that the latest supported dongle driver version is installed. The dongle driver is installed if there is no previous installation of the dongle driver or if the installed dongle driver is older than the latest supported version.

Note: If the dongle driver is installed during installation, you need to reboot your PC and restart the installation after reboot.

Program files are stored under "*C:\Program Files\Nokia\Phoenix*" (default).

6. Install the data package by executing the installation package and follow the instructions on the screen.

The data packages will create product specific directories under the installation directory.

Data files are stored under "*C:\Program Files\Nokia\Phoenix*" (default).

Uninstalling Phoenix

If you need to remove Phoenix Service Software from your computer:

1. Make sure that the dongle is attached (unregistration).

2. Go to the Control Panel and select **Add/Remove Programs.**

3. Select RH-29 RELEASE for uninstallation and click **Add/Remove**.

4. Click **OK** to remove the application

You may have to reboot your PC after uninstallation.

Note: If you have different product packages installed, the components are uninstalled only if they are not included in other product packages.

Data Packages

Data Packages (DP) is a name for a helpful feature in the Phoenix software. This type of feature provides a flexible way of distributing and installing Phoenix and its data files.

All product-specific data is separated from the program code and installed separately. This means that the installation is performed in at least two steps.

Each product will have its own Data Package (DP). The FPS-8 flashing equipment also has its own package.

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Starting a session

Concepts

In the Phoenix context, *Product* means the cellular phone attached to a PC. More specifically, it is a particular type of phone.

Connection means the type of cable used to attach the phone to the port to which the other end of the cable is attached.

Selecting a product

Many of Phoenix's features are product-specific. It is, therefore, mandatory to choose the product you will be working on at the beginning of the session.

Select the menu item *File - Choose Product.* You will be presented with a list of available products.

After the product selection, you will see an additional menu item on the main menu. If you take a look at the available menu items, you will see that their number has increased.

Selecting a connection

The connection defines the cable and the communications port that will be used when connecting to the phone.

1. Active connections are listed in the toolbar's *Connection* pull-down menu. You should make sure that the connection is correct before using the software. Change it, if necessary.

In case the connection is the wrong, you need to create a new one.

2. Select *Settings* from the pull-down menu.

3. Select *Add* in the *Connection List Dialog* and in fill the relevant fields in the *Connection setup* dialog.

Phoenix environment

You can configure the program's main toolbar and the product or tool -specific options to your liking.

You can control which toolbars are visible by selecting **View** and **Toolbars** from the pull-down menu. The visible toolbars are marked with a check.

The rest of the options are product or tool -specific. The tool-specific options are set using the associated toolbar.

Using components

When working with Phoenix, each task generally has its own component that will per-

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form the task. The first thing, therefore, is to open the desired component.

Opening a component means that you open a tool window within Phoenix. When this window is opened, Phoenix also opens a toolbar for it and adds component-specific menu items in the **View** menu.

Using profiles

A Profile is a useful feature in the software. Product, connection and currently open components can be stored into a permanent storage (a disk file called profile, *.nmp) for later retrieval.

Opening and saving profiles is done via menu commands found in the **File** menu. Select *Open Profile* and *Save Profile*.

Since profiles are stored into a disk file with the user-defined name, there can be multiple profiles for different repeated tasks.

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SW Update Flashing Setup

FPS-8 Flash setup

The following equipment is required for RH-29 AMS SW update, when connecting RH-29 to PC with FPS-8:

Item	Description	Type	Code
1	Docking station adapter	DA-17 (use with JBV-1)	0770701
1a	Point of Sales flash loading adapter	FLA-48	0770582
2	Power cable	PCS-1	0730012
3	Power cable	FLC-2	0730185
4	Modular cable	XCS-4	0730178
5	Flash prommer box sales pack	FPS-8	0080321
6	Printer cable	AXP-8, incl. in FPS-8 sales pack	
7	D9 – D9 cable	AXS-4, incl. in FPS-8 sales pack	0730090
8	Software protection key	PKD-1	0750018
9	AC Charger,	incl. in FPS-8 sales pack	0680032
10	SRAM Module (2 pcs needed inside FPS-8)	SF12	0080346 (Code includes one SRAM module)

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POS Flash concept

The following equipment is required for RH-29 AMS SW update, at point of sale when connecting RH-29 to PC with FLS-4:

Item	Description	Type	Code
1	Point of Sales flash loading adapter	SF-20	0770702
2	Service cable	XCS-1	0730218
3	FLS-4S sates pack for E & A	FLS-4S	0080541
4	FLS-4S sates pack for APAC	FLS-4S	0080542
5	FLS-4S sates pack for US	FLS-4S	0080543

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Module Jig Flash concept

The following equipment is required for RH-4 AMS SW update when system module is placed in the Module Jig DA-17 and connected through a FPS-8 set-up:

Item	Description	Type	Code
1	Module Jig	DA-17	0770646
2	Power cable	PCS-1	0730012
3	Modular cable	XCS-4	0730178
4	Flash prommer box sales pack	FPS-8	0080321
5	Printer cable	AXP-8, incl. in FPS-8 sales pack	
6	D9 – D9 cable	AXS-4, incl. in FPS-8 sales pack	0730090
7	Software protection key	PKD-1	0750018
8	AC Charger,	incl. in FPS-8 sales pack	0680032
9	SRAM Module (2 pcs needed inside FPS-8)	SF12	0080346 (Code includes one SRAM module)

Note: All tunings except Zocus calibration can be done with JBV-1/DA-17 concept by using XRF12 RF cable.

RH-29 Phoenix installation instructions

Now that cables have been connected, you must install RH-29 version of Phoenix to your PC.

- 4.13.005 is currently the newest available RH-29 AMS Phoenix SW

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NOTE! You must use 2003.17.3.12 Phoenix release in order to get new SW into your RH-29 phone.

- Save the package to your hard disk and install it by double-clicking it.

NOTE! It is recommended that you uninstall previous Phoenix package before installing the new one. Do it as follows:

- Click Start -> Settings -> Control Panel
- Add/Remove Prog.
- Phoenix RH-29 release
- Add/Remove

Reboot your computer after uninstallation

FPS-8 to PC connection Setup instructions

Establish connection between your PC and FPS-8. The procedure is as follows:

- Start phoenix
- Choose **File** -> **Manage connections**
- Choose **Add**
- Select mode, select **Manual**
- As Media, select **FPS-8**
- Port number, select the port where you have connected the serial cable of FPS-8.
- COMBOX_DEF_MEDIA, select **FBUS**
- Click on **Finish**
- Press **Arrow up** key so that FPS8 COM1 FBUS becomes the first on the list.
- Press **Apply** and close the window

The connection between PC and FPS-8 has now been configured.

FPS-8 activation

Follow the instructions inside FPS-8 sales pack to get FPS-8 activated.

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Checking Application SW version inside FPS-8

When you have connection established to FPS-8 and FPS-8 has been activated, the first thing to do is to check that you have correct application SW version inside FPS-8. Phoenix SW can check that automatically. The procedure goes as follows:

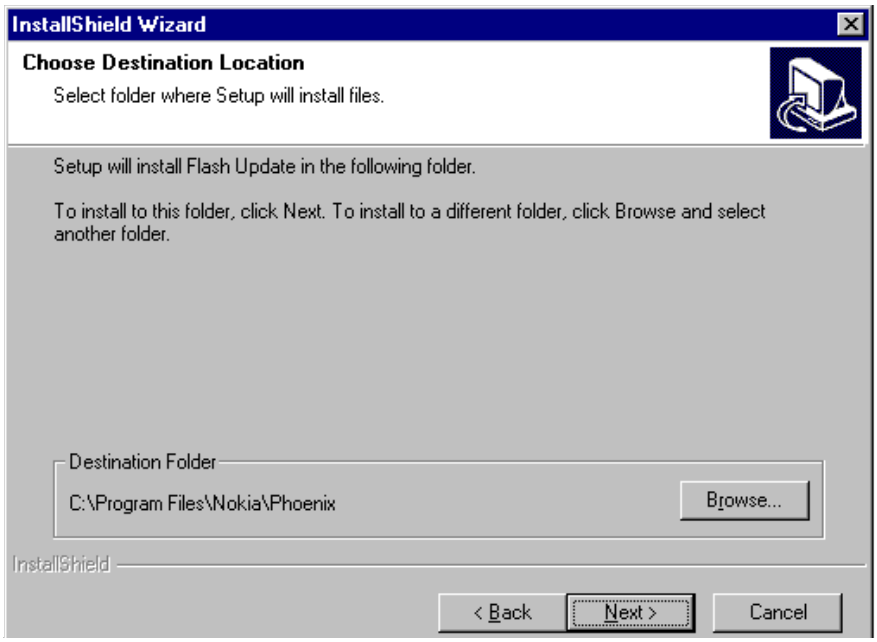
Go to the partner web site and take newest AMS FPS-8 SW.

Instructions:

- Click FPS-8 downloads
- Click **Flash Update**
- Click **AMS/Production version**
- Click 2.10.000
- Take file **flash_update_02_10_000.exe**
- Save it to your hard drive to a place which you can remember
- Go to that directory and click on **flash_update_02_10_000.exe**

You will see the following note on your screen. Install files to the directory which installation program suggests to you.

Figure 1: Install Shield Wizard screen


InstallShield Wizard
Choose Destination Location
Select folder where Setup will install files.
Setup will install Flash Update in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\Program Files\Nokia\Phoenix
Browse...
InstallShield
< Back
Next >
Cancel

When the installation has been finished, FPS-8 files are located in that directory.

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You can now start phoenix SW.

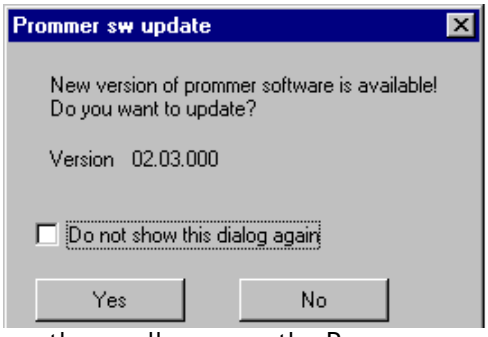
When phoenix SW has stared, do the following:

Click on **flashing**

Click on **FPS-8/FPS-8C Maintenance**

If SW inside FPS-8 prommer is too old, you get the following notification:

Figure 2: Prommer SW update screen



Click **Yes** and you see on the small scree as the Prommer goes to service mode (mode2 is lit) SW goes into box, application SW, Secondary boot codes and algorithm codes are updated.

There is no longer need to do anything special with RH-29 specific Secondary boot codes and algorithm codes.

Your PC and FPS-8 is now ready for RH-29 SW update.

SW update / Re-Flashing setups

The following setup diagram shows how to connect the different service devices when flashing the RH-29 phone. Make sure that you have selected the right one before proceeding.

For the part codes of the required accessories, please refer to the Service Accessory chapter.

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POS Setup with FLS-4S Adapter

As main interface either USB or Parallel port can be used. See figures below:

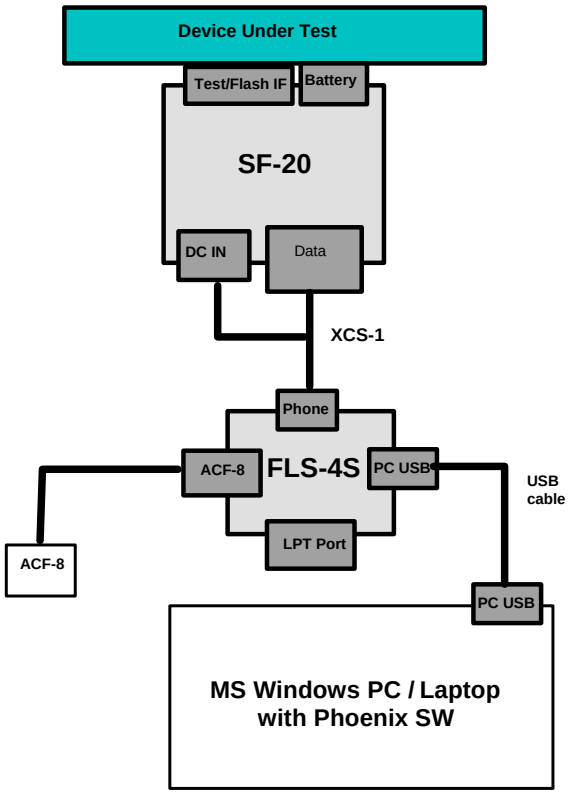

Figure 1: USB interface setup

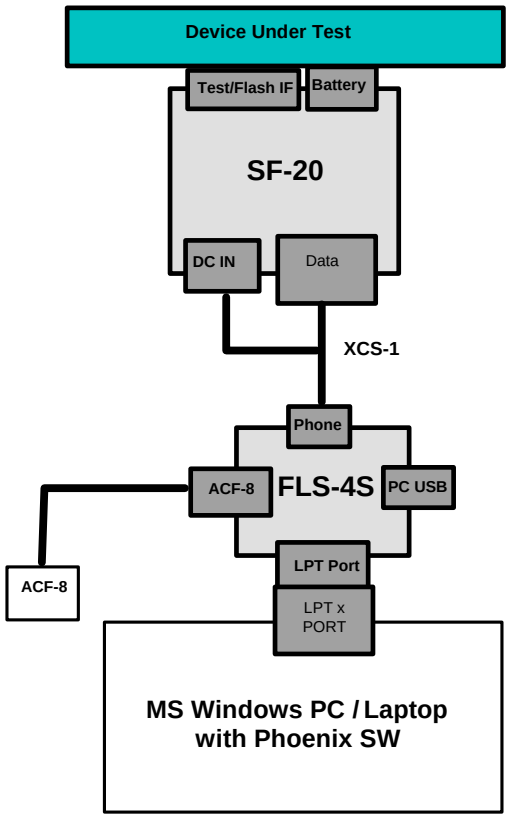

Figure 2: Parallel port setup

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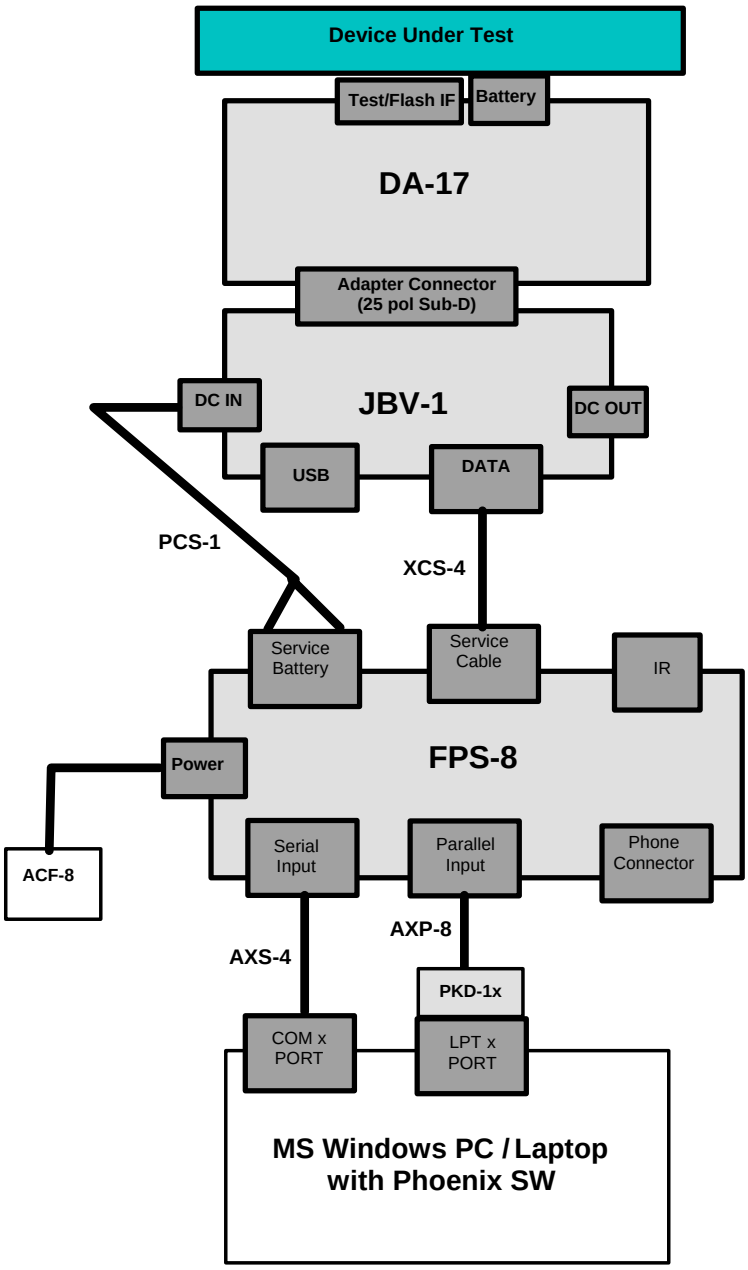
DA-17 flash setup



DA-17 SW update setup

Module repair jig flashing is possible with the following setup. Usually additional equip-

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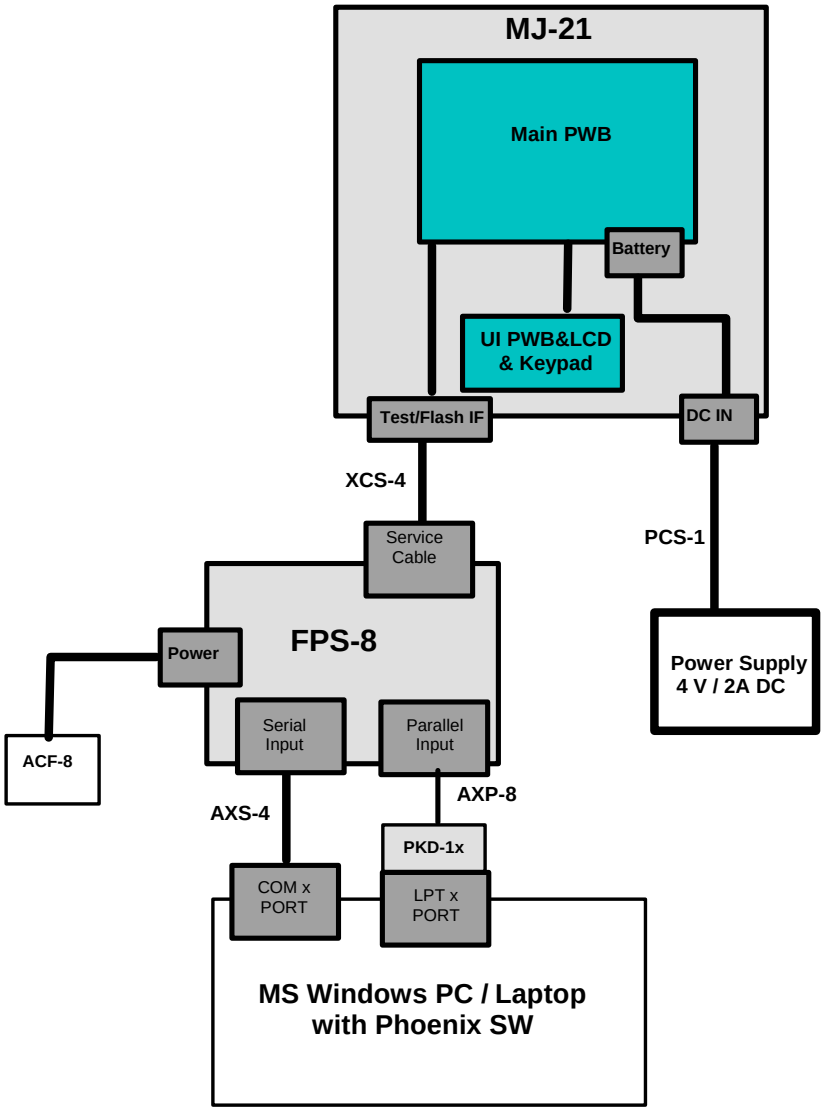
ment is connected for further repair activities.



Other setups

There are also other possible flash setup combinations, but these are rarely used.

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Flashing

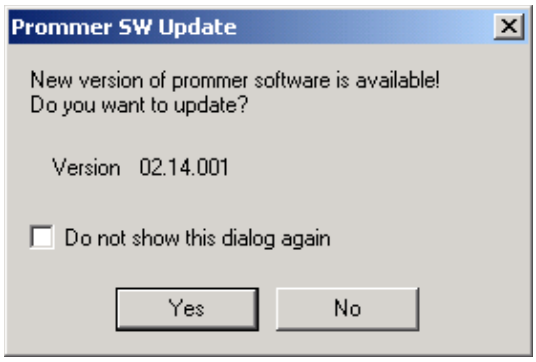
First ensure that all cables are connected according to one of the diagrams above (depending on the case)! See the respective chapter about connecting FPS-8 to PC.

Start Phoenix

Ensure that the latest AMS version of Phoenix is installed (Help-> About Phoenix). If a newer version is available you must install it (see Service SW Instructions for help installing Phoenix)

Go to *Flashing -> FPS-8 maintenance*

If SW in FPS-8 is old, you will get the following message:



Press OK and wait until the prommer is updated.

Now you are ready to flash the phone.

Remove the SIM card and MMC card from the phone.

Turn the phone ON.

Scan the phone by pressing **Ctrl + R** (Make sure that the phone is loaded: the phone type as well as the SW version should be displayed in the status line).

If no product is found, then choose RH-29 manually: *File -> Open Product*, and then select **RH-29.**

Go to *Flashing -> FPS-8 flash.*

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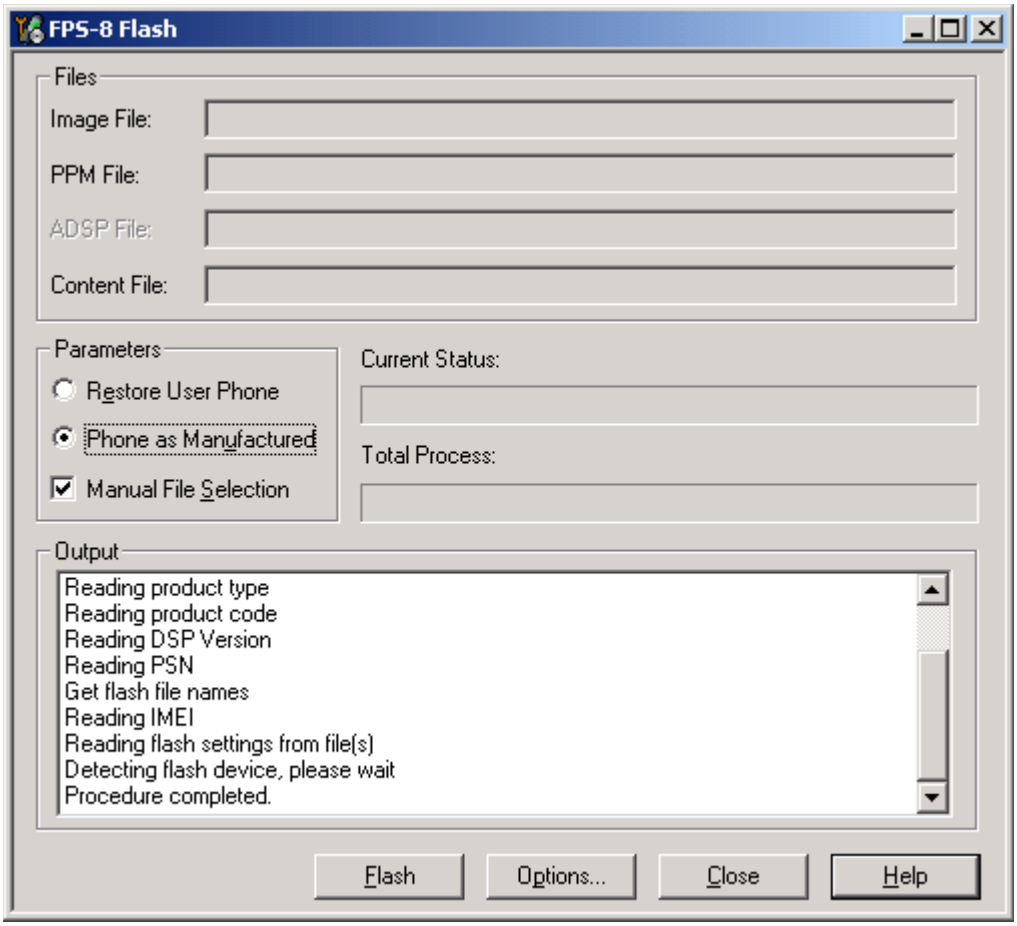
The following window appears:



Ensure that there is a data package installed: in this case the MCU, PPM and Content package files will be displayed automatically in the respective fields. Otherwise install a data package file (see related chapter).

Disable "*Manual file sel*ection" and press Flash.

In case a special SW version is needed, which is different than the currently displayed: Enable "*Manual file selection"* and press Flash.

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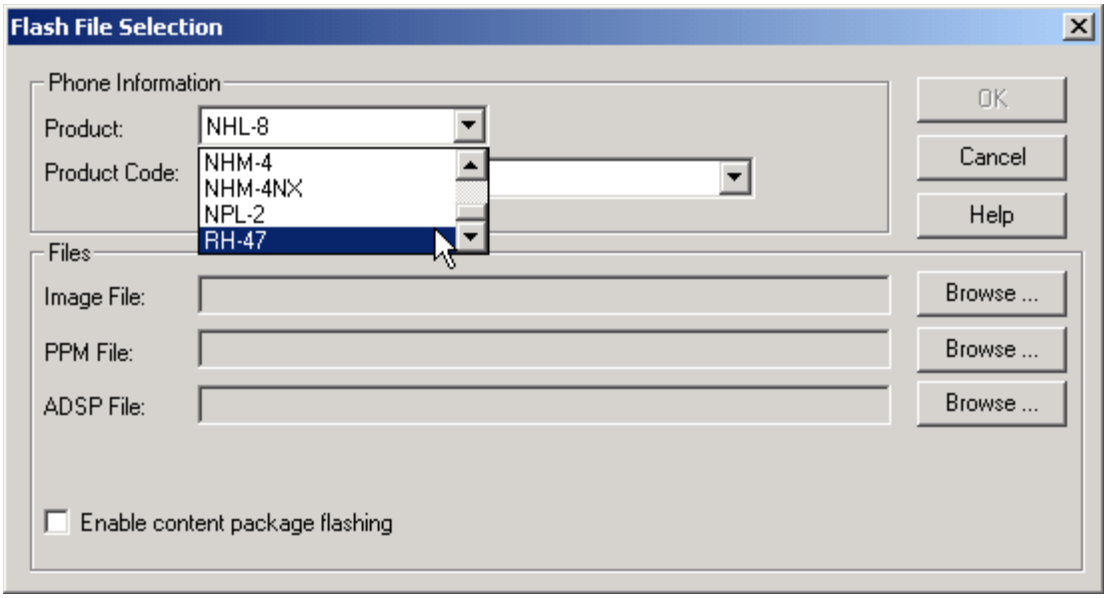
The following window appears:



In case a data package is installed: In **Product** drop-down menu select RH-29, and in **Product Code** drop down menu select the SW variant you want to flash. Finally click OK.

In case no data package is installed: Browse and choose manually the desired MCU, PPM and Content package files and click OK.

If an error message appears "*Turn the power on and select OK*" at the end of the flash process: disconnect the phone completely and connect it again, press the power button of the phone, wait about 15 sec. and press OK.

If the phone does not turn on, then the MCU SW version does not match the phone's HW and SW update is not possible.

After the phone is successfully flashed, the **user area** should be formatted.

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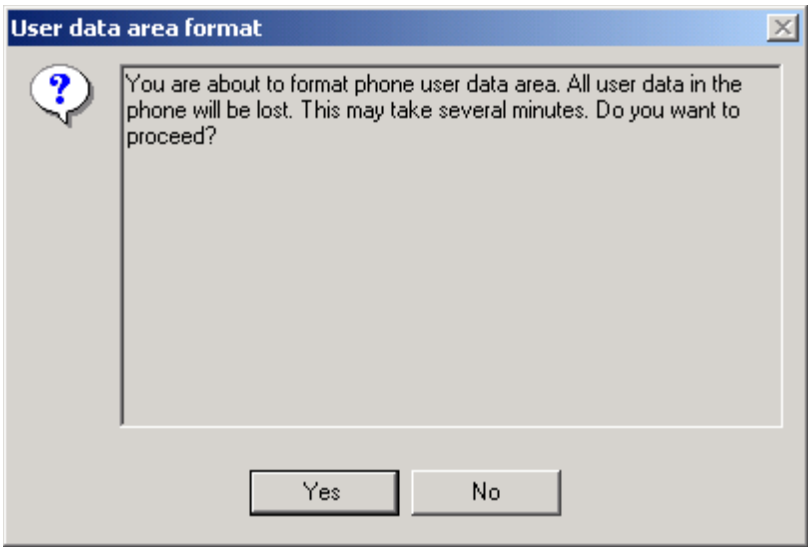
Go to *Product –> User area format.* The following window appears:


User data area format
You are about to format phone user data area. All user data in the phone will be lost. This may take several minutes. Do you want to proceed?
Yes
No

Press OK and wait until you get a confirmation that the user area is successfully formatted.

FLS-4S flashing

Connect all cables of FLS-4S as shown in the diagrams presented in section *POS Setup with FLS-4S Adapter* (use either Parallel port **or** USB).

Disconnect FPS-8 completely from the PC.

Make sure that you have the latest FLS-4S driver installed (in Windows: *Settings -> Control Panel - > FLS virtual port).*

The flashing process is the same as with FPS-8.

Go to *Flashing -> FLS-4S flash* and repeat the steps presented in the previous section (FPS-8 flashing).

Data package installation

Find out whether there is a data package installed in Windows: *Settings -> Control Panel -> Add Remove programs*.

If the current data package is old, please remove it. Then download the latest data package for **RH-29** to your hard disk: **RH-29_dp_v_0_02_MCUSW1_55.exe.**

Close Phoenix, double click the file and follow the instructions displayed on the screen.

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Reprogramming RH-29

Connecting cables

Once you have the RH-29 opened and the battery and SIM removed, attach it to the FLA-48 adapter. Once connected to the FLA-48 the phone goes to local mode and the screen will not show anything during SW update.

Proceed as follows:

- Connect XCS-4 cable from FLA-48 to FPS-8
- Connect FLC-2 cable from FPS-8 to FLA-48
- There is no need to press the phone power key. Phone has set itself automatically to local mode and it is now ready for SW update.

Settings backup/restore

It is quicker to use MMC user data backup, which can be found at: Menu > extras > memory > options > backup phone memory.

Start Phoenix SW by double-clicking the **Phoenix icon** on your desktop.

- Now choose **File** -> **Scan product**. If phone is ok, you should see the SW version in lower right-hand corner, e.g. V3.1
- If the scanning finds nothing, the phone is most likely in some strange mode.

Settings Backup:

- Click **Product**
- Click **User settings**
- Click **All Settings**
- Click **Browse**
- Choose from Directory **C:\Program files\Nokia\Phoenix\Products** file **Nhl8sett.ini**

You will now see the following PC screen:

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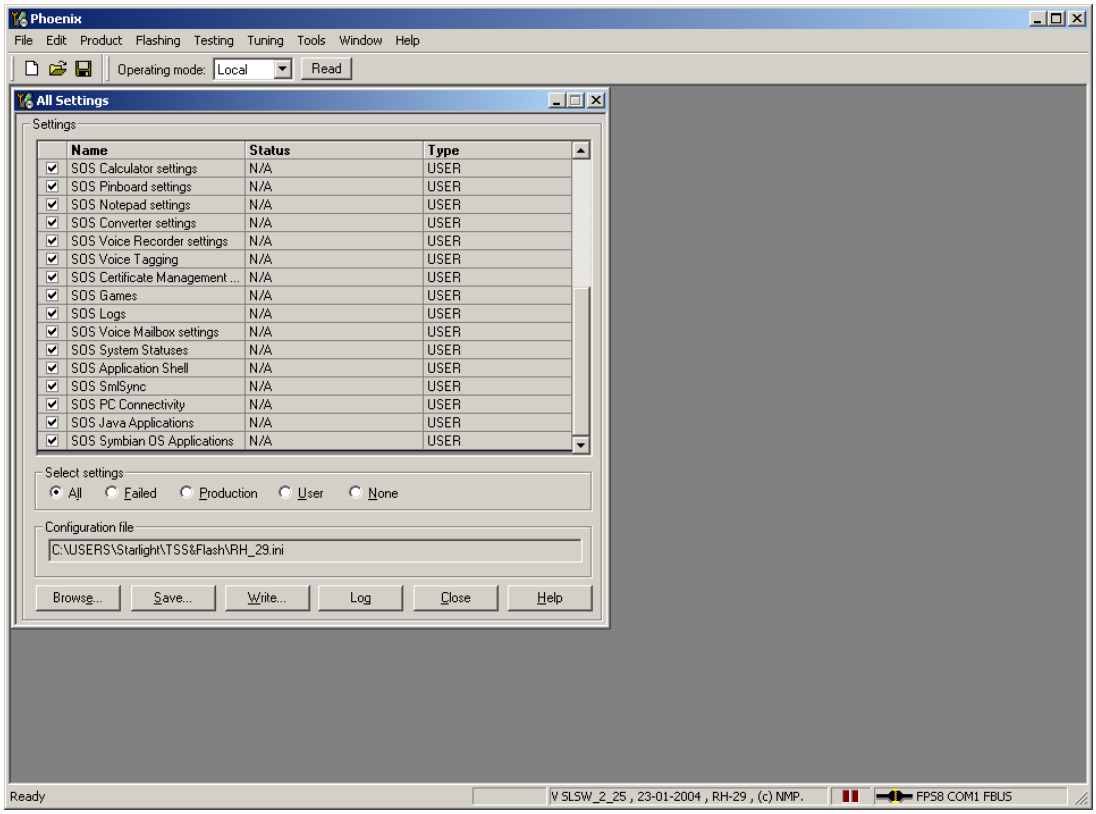
Figure 3: All settings screen



Updating software

New SW package can be updated.

- Choose **Flashing** -> **FPS-8 Flash** -> Mark both **log flashing** and **Manual Selection.** Then Click on **Flash.**
- Now in Flash file selection window, choose the product code.

Select the correct file:

Now click on **OK**, and SW update starts.

You will see as the 18 MB package goes into FPS-8 (If transfer is very slow, it is recommended that Parallel port is in ECP mode. Transfer in ECP mode is much faster).

If you do not know how to Change PC Parallel port mode from BIOS, contact your local support.

Then Phoenix erases flash memories.

And finally you will see how SW package goes into phone (When SW update takes place, Yellow Mode 1 led is blinking fast)

When SW update has ended yellow led stops blinking and you get a note in windows SW.

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You will get instructions to turn the phone on. Do so and wait 15 seconds.

Formatting user area

User area also needs to be formatted in order to make sure that there is no user data left in the phone.

Choose **File** -> **Scan product. In the bottom of the Phoenix window you should see V3.1, Date, RH-29(c) NMP**

Format User area the following way:

Click **Product** -> **User area format**. You will get a note warning you about loss of user data. Click **yes** on that.

Phoenix shows Formatting user data area, Please wait screen for a while and gives you a success note.

Restore settings

Settings can be restored from MMC or Phoenix.

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Energy Management Calibration

Connections

RH-29 phone must be connected to JBV-1 (Docking station) with DA-17 (Docking station adapter).

- Connect CA-5S (DC-DC cable) from JBV-1 into to phone charger connector before powering up JBV-1.
- Power up JBV-1 from external power supply: 11-16 V DC. (Do not take power from FPS-8 in calibration mode).

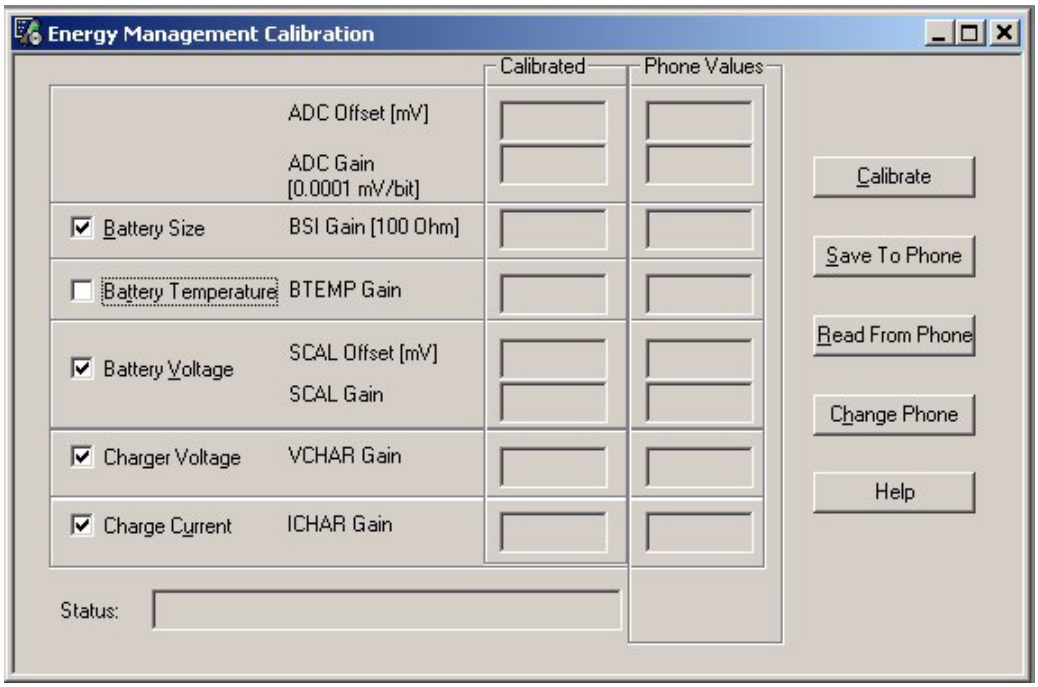
Phoenix setup

- Start Phoenix.
- Select FBUS connection.
- Choose *Main -> Choose product…*
- Choose *Maintenance -> Tuning -> Energy Management Calibration component.*

Calibration

1) Mark all channels (*ADC, Battery Size…except Battery temperature).*

Figure 4: Energy Management Calibration screen



2) Press *Calibrate* button.

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After successful calibration *Calibrated* indication is shown.

3) Press *Save To Phone* to save tuning values into phone memory.

After successful saving *Values written to phone* is indicated.

4) Verify tuning values saving by pressing *Read from Phone*.

ZOCUS calibration

Zocus requires re-calibration only if the Zocus device itself is replaced, any of the components on the sense input (R383, R384 and C386) or if the flash memory is corrupted. Zocus does not require recalibration if the UEM device is replaced or if any of the other energy management calibrations are recalibrated.

1 Place the PWB in the module jig.

2 Connect an ammeter across the ammeter + and ammeter - connections.

3 Set switch S2 to the calibration position.

4 Power up the module jig in local mode - the ammeter will indicate the local mode current.

5 Connect the charger input to a power supply set to 8.4V and current limited to 500mA. Turn power supply on.

6 Open the Zocus EM window in Phoenix.

7 Click on "Close the Charge Switch".

8 Adjust the current limit on the power supply until the ammeter reads 500mA ±5mA.

9 Type the measured current (read this from the ammeter) into the "Measured Current" box. The value is negative and presented in Amps e.g. if you measure 502mA, then type -0.502. The reading should be to the nearest mA.

10 Click the "Calibrate" button.

11 If you wish to check the calibrated value then do not choose to close the charge switch. The calibrated current value will appear in the Zocus_Cal_Current window.

12 The calibration value appears in the box Zocus_New_Cal. To write this to the

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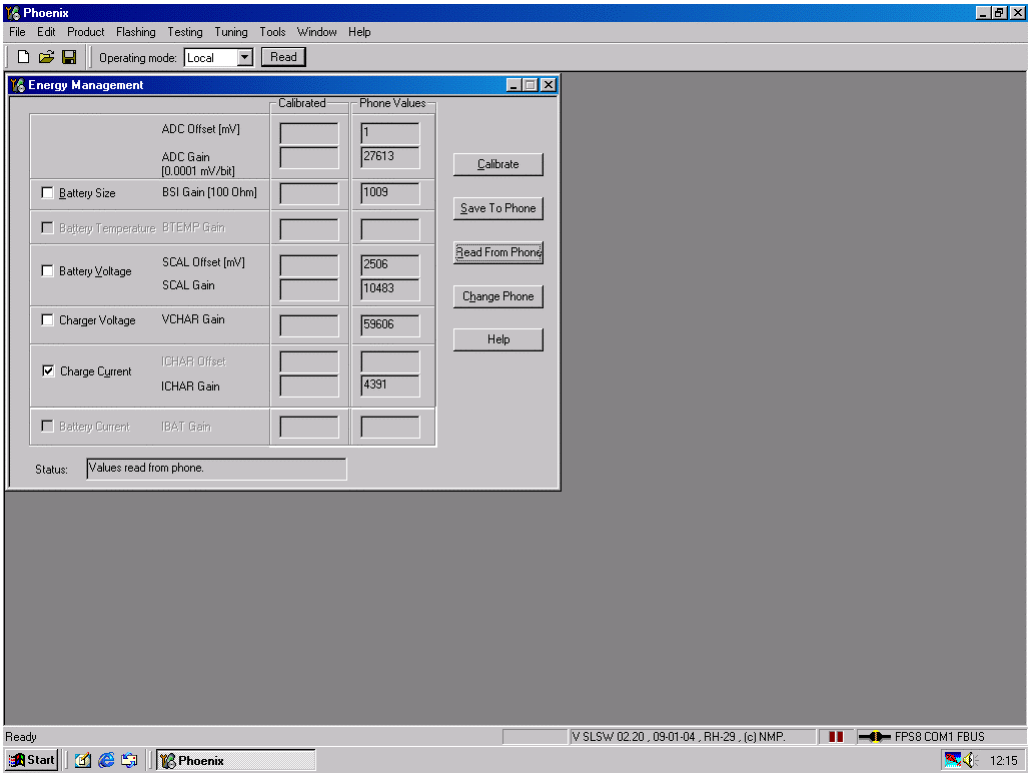
phone click “Write”.



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Phoenix Tuning

Connect the phone to a PC running the Phoenix Service Software.

Start Phoenix Service Software and open FBUS connection

Select File Scan Product

Wait until phone information is shown in the lower right corner of the screen.

RF tuning after repairs

Different repairs require different tuning. In general it is necessary to determine in which section the repair was done to select which tunings to perform. To determine if RF tuning is necessary after repair it is important that the functionality of the repaired circuit is understood well. It is recommended to perform complete RF tuning if RF is repaired.

- In general repairs in the TX part will require "TX Power Level Tuning" and "TX IQ Tuning".
- In general repairs in the RX part or PLL part always require "RX Calibration", “Rx Band Filter Response Calibration”.
- If Mjoelner is changed all calibrations have to be done.

Other parts interfacing to TX, RX or PLL might require tuning, but common sense should be used, e.g. if a component that has no influence on RF performance has been changed, e.g. the microphone, on/off key, mechanical parts or similar, there is no need to do any RF tuning.

RX channel select filter calibration

This calibration is calibrating the Base band filter inside Mjoelner. It is done by internally measuring a prototype filter, for this reason the calibration is done once, not separately in 2 bands.

Set operating mode to local mode

Select Tuning Alt-U

RX Channel Select filter Calibration F

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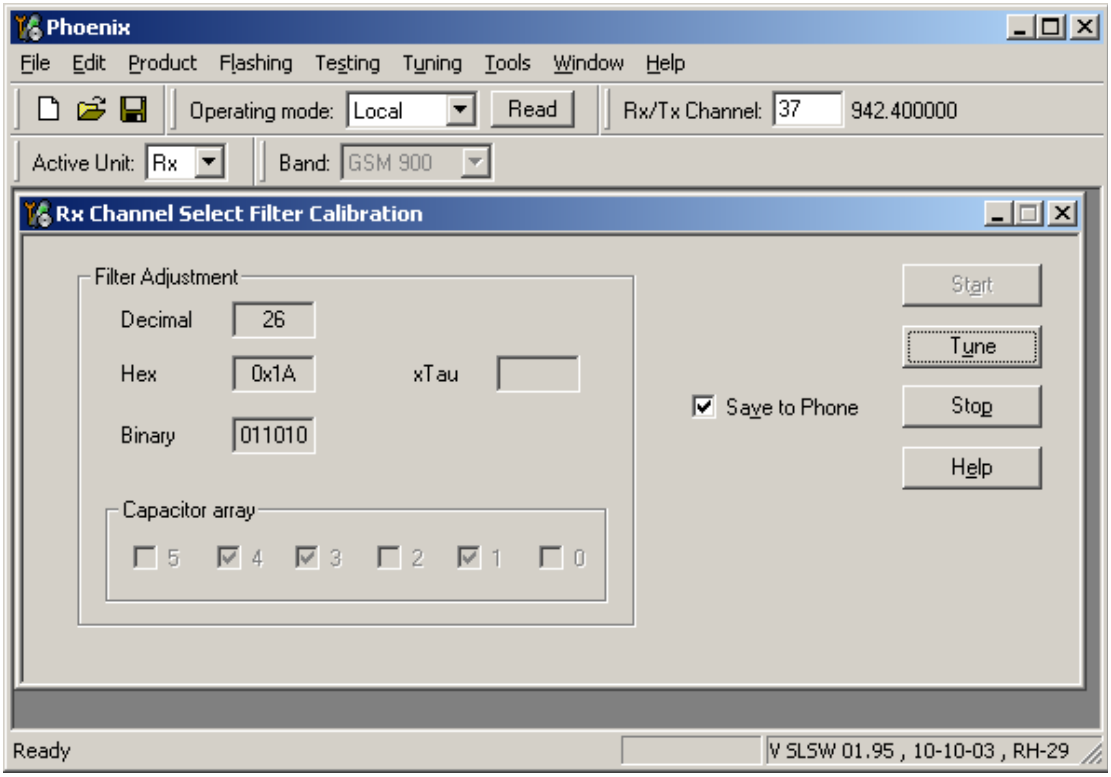
The setup should now look like this:



Press Tune and the optimal values are found.

Make sure that Save to Phone is active. It can be activated by clicking with mouse or by pressing the letter v.

Press Stop and the RX Channel Select Filter Calibration is finished. You can now leave the tuning by closing the window.

RX calibration (incl. VCXO Calibration)

The "RX calibration" is used to determine gain at different gain-settings for front-end and Mjoelner and needs to be done in both bands.

RX-calibration requires an external signal generator.

RX-calibration in EGSM900 combines two tunings, VCXO-calibration and AGC-calibration:

Calibration of GSM1800 band only determines AGC values.

The **VCXO-calibration** finds out a calibration value for VCXO control, an AFC initial value and 3 AFC-slope coefficients.

A value (RF_TEMP), which represents the RF hardware temperature, is determined during RX Calibration. This temperature value is used by DSP to RSSI reporting in Normal mode

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of the phone. It is not visible in the calibration process.

AGC-calibration:

The AGC-calibration finds the gain values of the RX-gain system.
The AGC consists of RF LNA, which can be either on or off (gain difference between on and off state is nominally 30dB) and BB gain which can be controlled in 6dB steps. This gives 15 gain steps RSSI0 to RSSI14. LNA is off for steps RSSI0 to RSSI4.
AGC-calibration measures the gain at gain step RSSI4 and RSSI7. The other gain values are calculated.

VCXO-calibration:

The VCXO-calibration ensures the function of an **initial** synchronization (before location update is done) when the mobile station is in Normal mode. For an error free initial synchronization, the 26MHz frequency of the VCXO must be accurate enough. Therefore, a **VCXO cal** value is written into the RefOSCCAL register of the Mjoelner.

During VCXO-calibration, the **VCXO cal** value is changed by a DSP-algorithm until a synchronization is possible. This means the VCXO oscillates at 26 MHz with a sufficient minimum frequency error.

To further minimize the frequency error, an initial **AFC value** is determined by the DSP and written into RefOSCAFC register of the Mjoelner.

Also the DSP algorithm determines 3 AFC slope coefficients **Slope C1...3** during VCXO calibration. One AFC slope value is not sufficient for Mjoelner **F3**, because the AFC slope is non-linear in this chip.

EGSM900 and DCS1800

Select	Tuning		Alt-U
		RX Calibration	C

Wait until the RX Calibration window pops up.

Select	Band	GSM900

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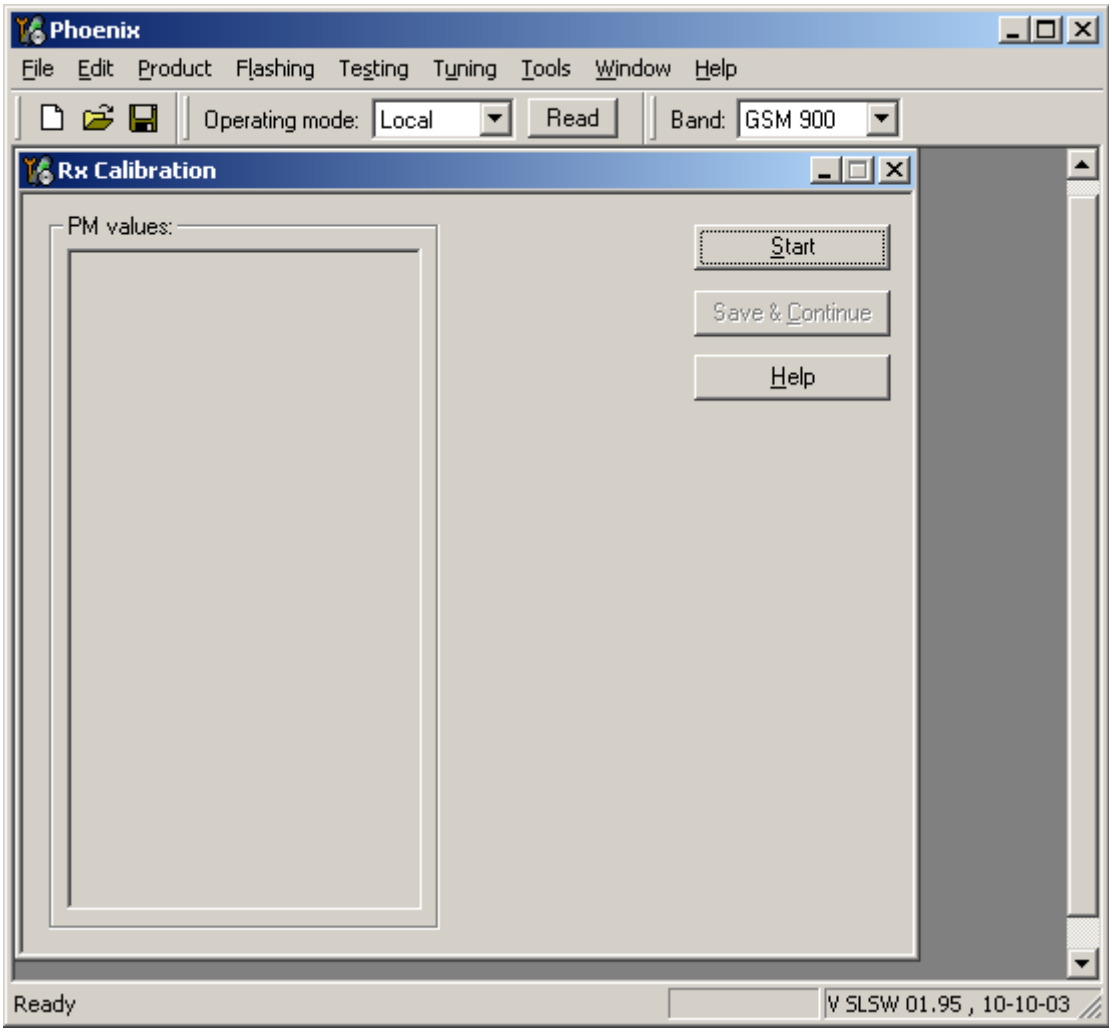
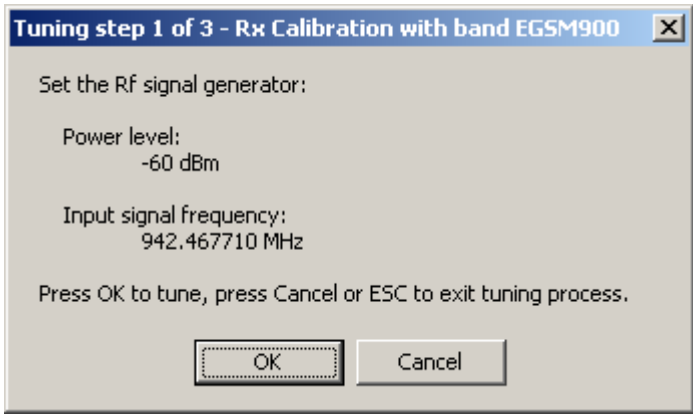
The setup should now look like this:



Press Start and a new window pops up:


Tuning step 1 of 3 - Rx Calibration with band EGSM900
Set the Rf signal generator:
Power level:
-60 dBm
Input signal frequency:
942.467710 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Connect an external signal generator to the RF connector of the phone and set the generator as told in the window, taking care for external cable losses.

Press OK and the window closes.

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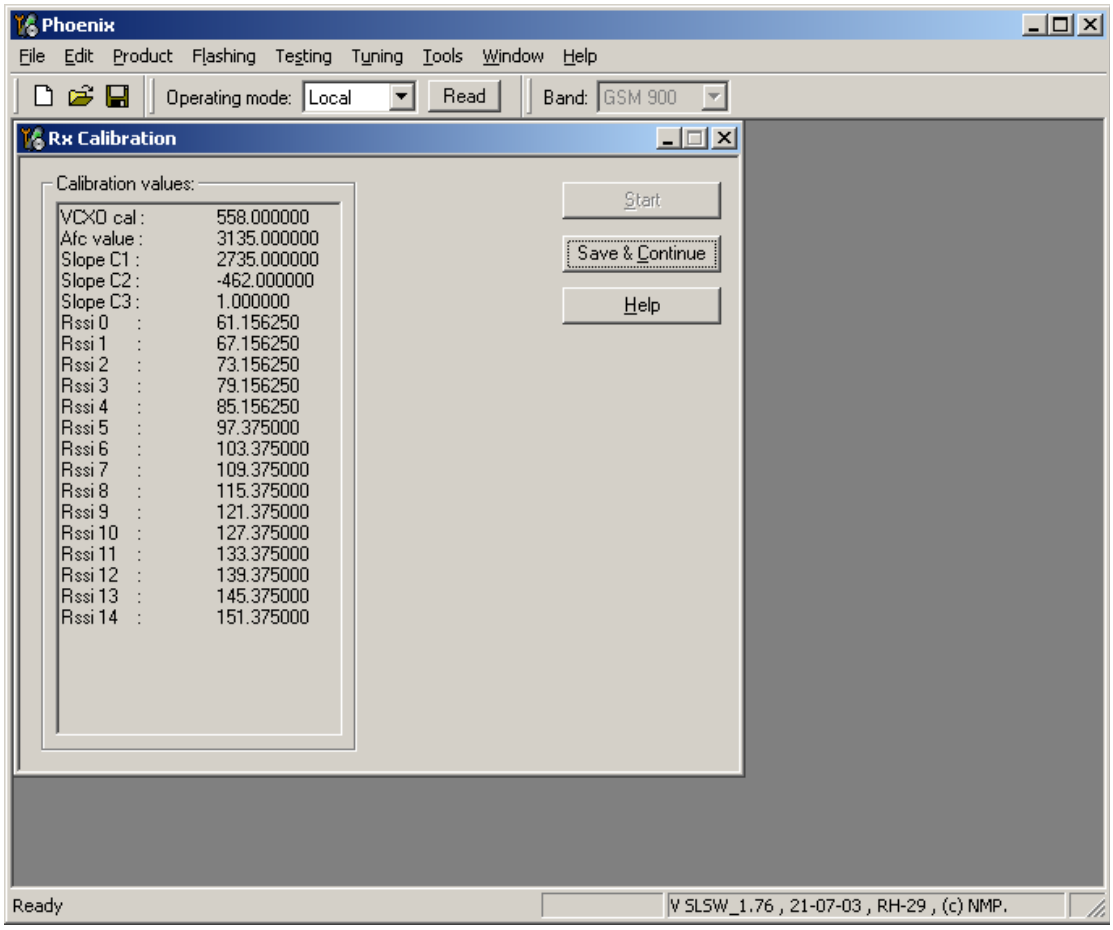
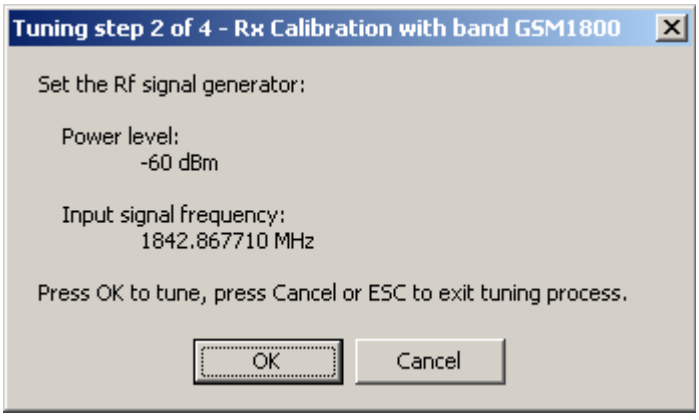
A typical result will look like this:



The EGSM900 has been tuned. To proceed to DCS1800 tuning, press Save & Continue and a new window pops up:


Tuning step 2 of 4 - Rx Calibration with band GSM1800
Set the Rf signal generator:
Power level:
-60 dBm
Input signal frequency:
1842.867710 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Let an external signal generator be connected to the RF connector of the phone and set the generator as told in the window, taking care of external cable losses.

Press OK and the window closes.

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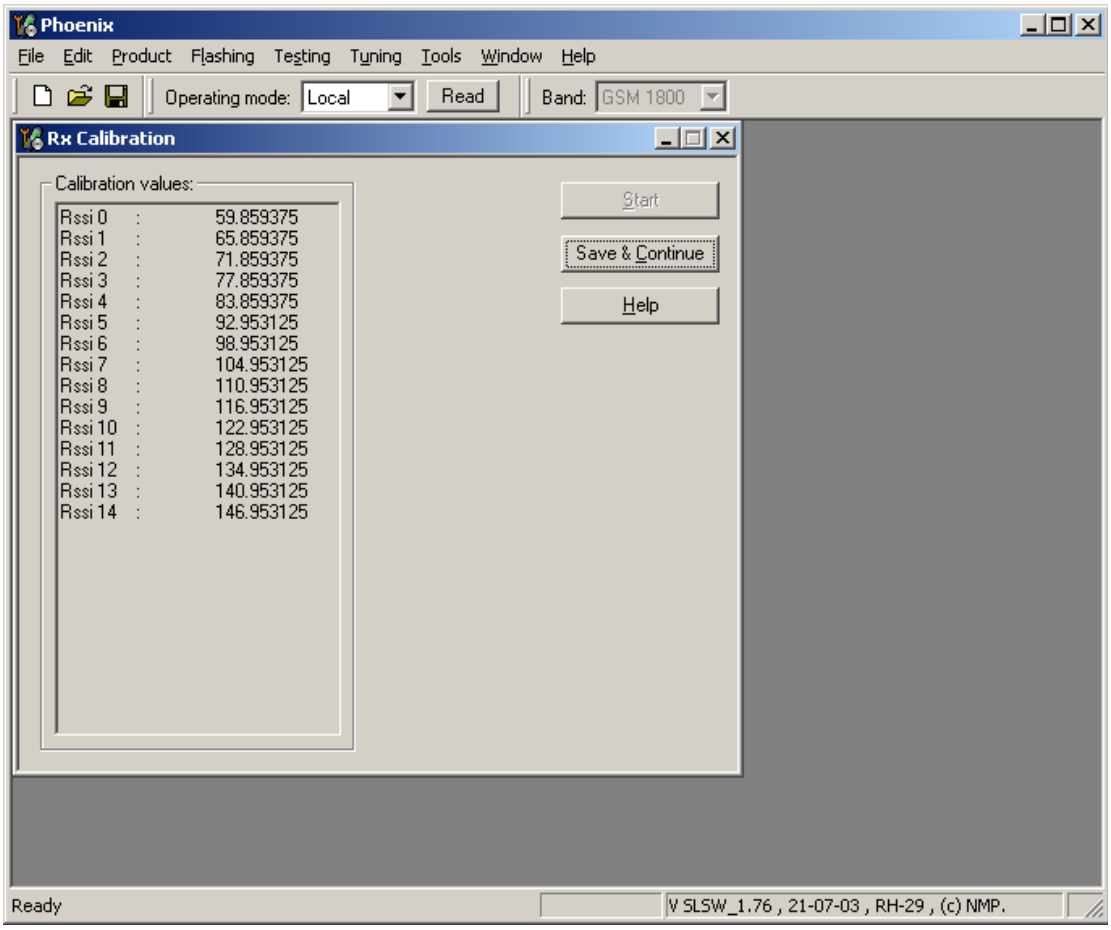
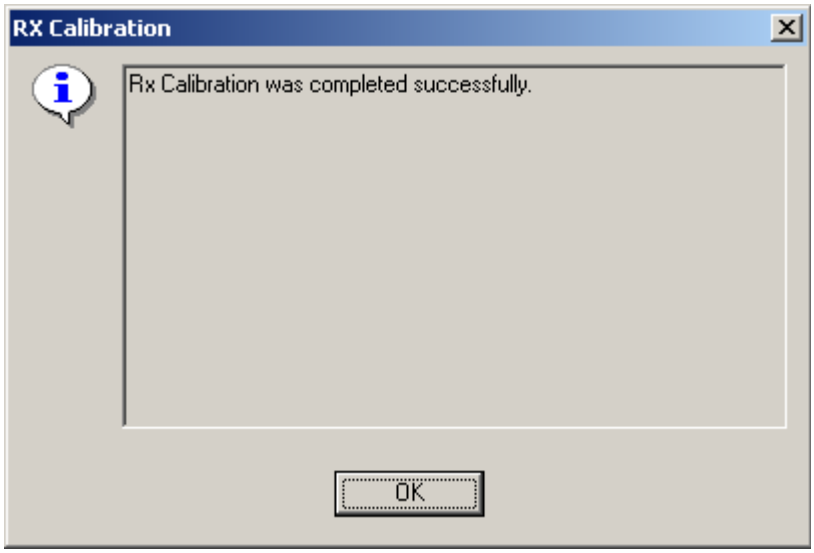
A typical result will look like this:



Press Save and Continue, and a new window pops up:



Press OK and the RX Calibration of the EGSM900 and DCS1800 are finished.

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RX AGC limits

The Rx calibration is only valid if it is within certain limits.

For the most recent limits see RH-29 Production Testing Requirements,

If calibration is not within limits, there is a fault in the RX chain.

Below the values for RSSI4 and RSSI7 are given:

RSSI4:

Table 1:

band	min	typ	max
EGSM900	81	86	91
DCS1800	79	85	89

RSSI7:

Table 2:

band	min	typ	max
EGSM900	103	108	113
DCS1800	100	104	110

RX band filter response compensation

EGSM900 and DCS1800

Set operating mode to local mode

Select Tuning Alt-u

RX Band Filter Response Compensation B

Select Band EGSM900

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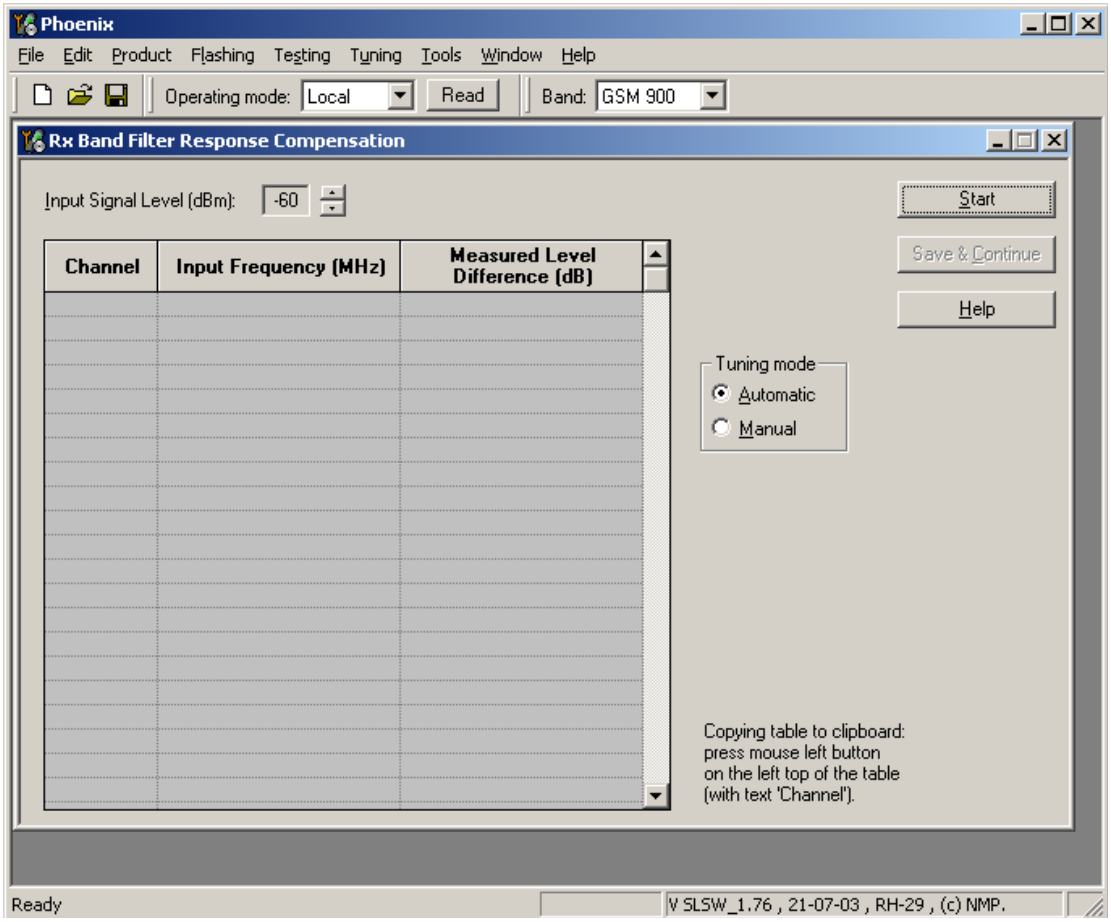
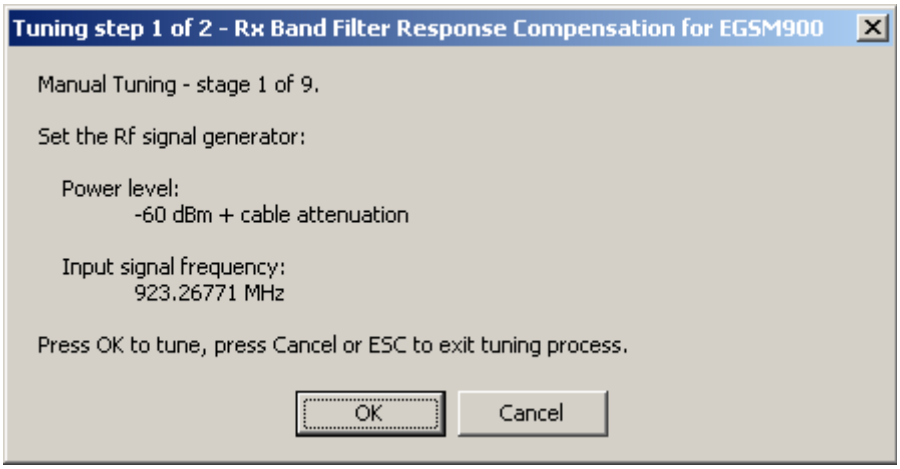
The setup should now look like this:



Select Input Signal Level -60dBm

Manual tuning

Press Manual tuning and a window pops up:


Tuning step 1 of 2 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 1 of 9.
Set the Rf signal generator:
Power level:
-60 dBm + cable attenuation
Input signal frequency:
923.26771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Connect an external signal generator to the RF connector of the phone and set the generator as told in the window.

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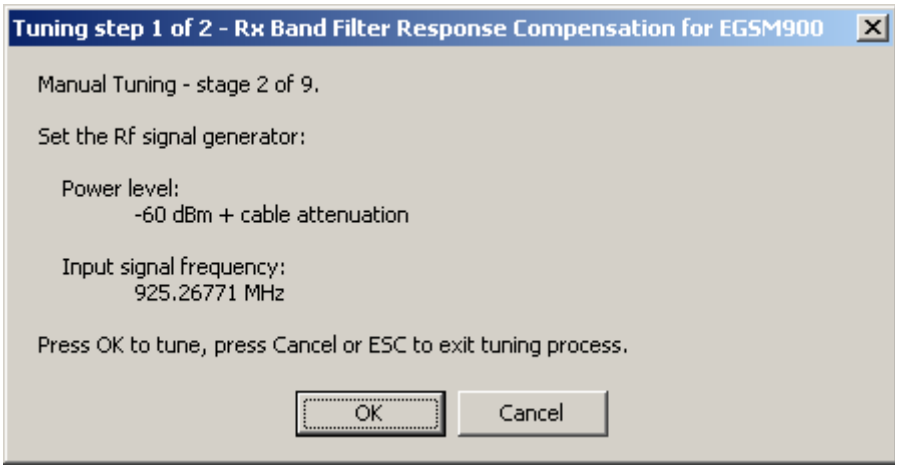
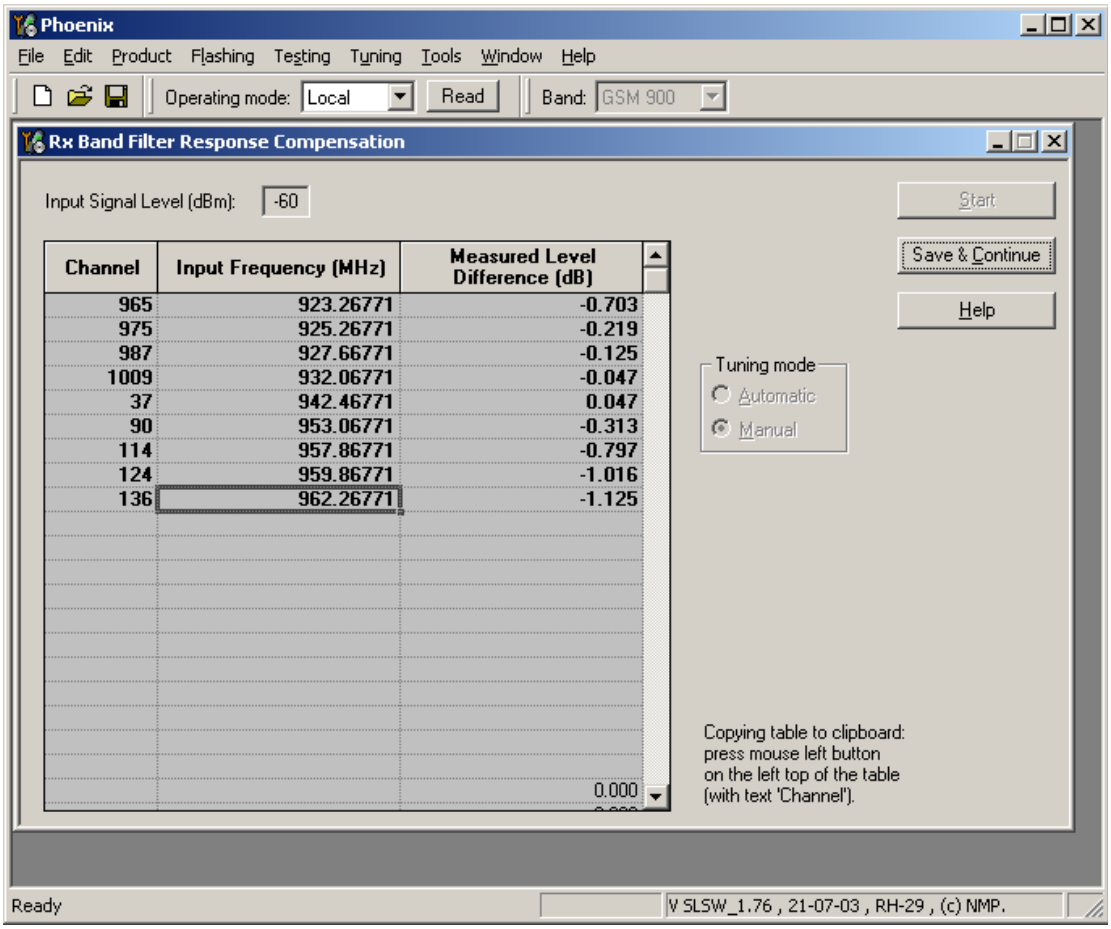
Press OK and a new window pops up:


Tuning step 1 of 2 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 2 of 9.
Set the Rf signal generator:
Power level:
-60 dBm + cable attenuation
Input signal frequency:
925.26771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Set the generator as told in the window.

Press OK and a new window pops up. Repeat this sequence **9 times** until all channels are done.

A typical result will look like this:



The EGSM900 has been tuned. Press Save and Continue to proceed to DCS1800 tuning.

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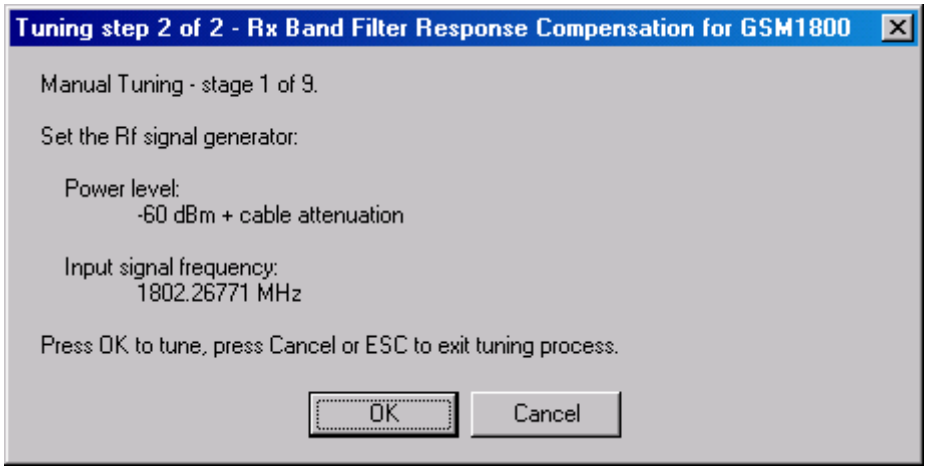
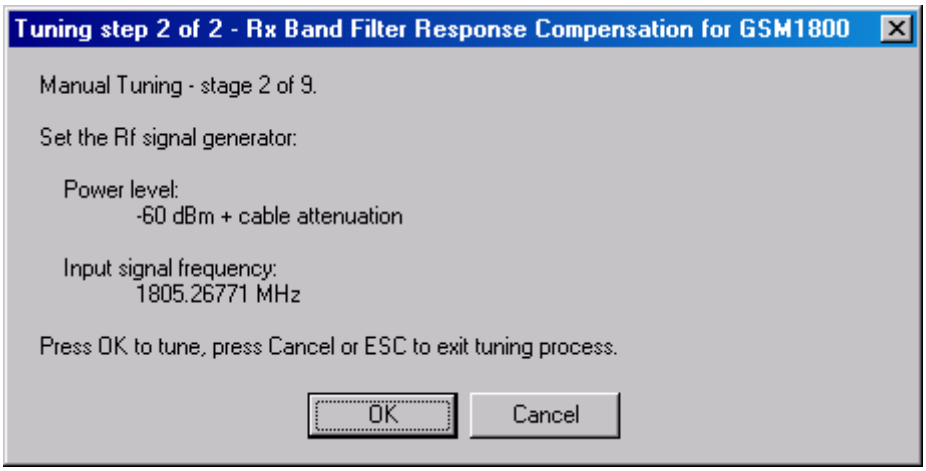
A window pops up:


Tuning step 2 of 2 - Rx Band Filter Response Compensation for GSM1800
Manual Tuning - stage 1 of 9.
Set the Rf signal generator:
Power level:
-60 dBm + cable attenuation
Input signal frequency:
1802.26771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Let the external signal generator be connected to the RF connector and set the generator as told in the window, taking care of external cable losses. Press OK and the following window pops up:


Tuning step 2 of 2 - Rx Band Filter Response Compensation for GSM1800
Manual Tuning - stage 2 of 9.
Set the Rf signal generator:
Power level:
-60 dBm + cable attenuation
Input signal frequency:
1805.26771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Set the generator as told in the window.

Press OK and a new window pops up. Repeat this sequence **9 times** until all channels are done.

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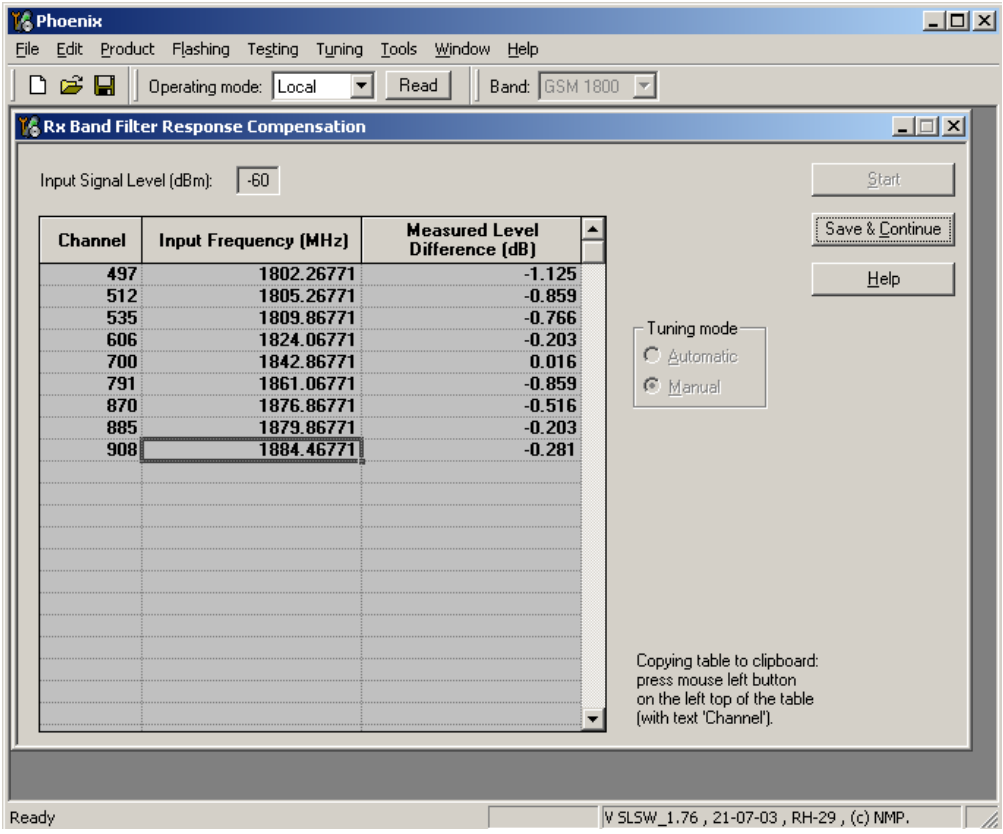
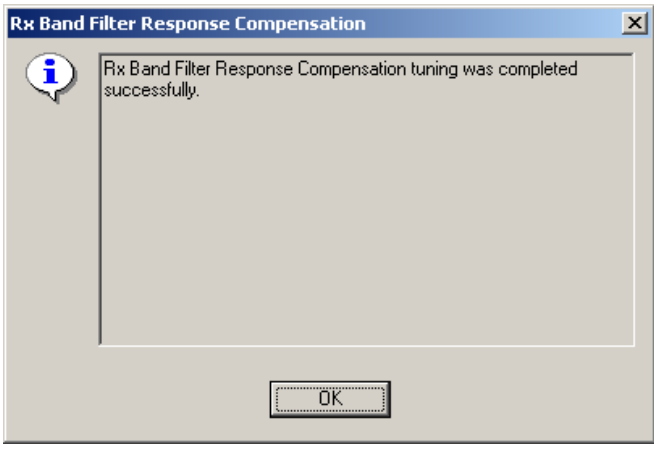
A typical result will look like this:



Select Input Signal Level -60dBm

The DCS1800 has been tuned. Press Save and Continue to finish the tuning. A new window pops up:



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TX I/Q tuning

This tuning must be done in both bands.

EGSM900

Caution: In case you use a spectrum analyser make sure that the external attenuation (20 - 30dB) between phone and spectrum analyser is high enough that the input of the analyser can't be destroyed. Adjust the reference level offset according to the insertion loss from the phone to the spectrum analyser.

PC/Phone operation:

Set operating mode to local mode

Select Tuning Alt-u

TX IQ Tuning I

Wait until the TX IQ Tuning window pops up.

Select Testing Alt-s

RF Controls R

Wait until the RF Controls window pops up.

Connect a Spectrum Analyzer or GSM tester with the option *Narrow Spectrum' to the RF connector of the phone.

If a spectrum analyzer is used then use the following settings.

Table 3:

	EGSM900
Center Frequency	897.4 MHz
Frequency Span	200 kHz
Resolution Bandwidth	3kHz
Video Bandwidth	3kHz
Sweep Time	3 sec.
Sweep Type	Clear/Write
Detector Type	Max Peak
Reference level	35 dBm
Marker 1	897.33229 MHz
Marker 2	897.4 MHz
Marker 3	897.46771 MHz

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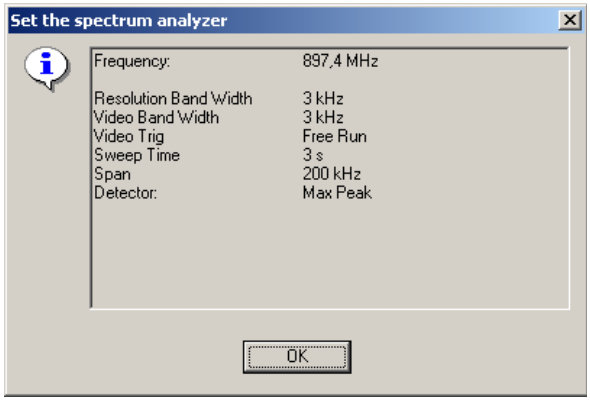
Select in the RF Controls Window:

Select	Band	GSM900
	Active Unit	TX
	Operation Mode	Burst
	RX/TX Channel	37
	TX PA Mode	Free
	TX Data Type	All1

Press Start

The following window pops up:



Select again in the RF Controls Window:

Select	TX Power Level	5

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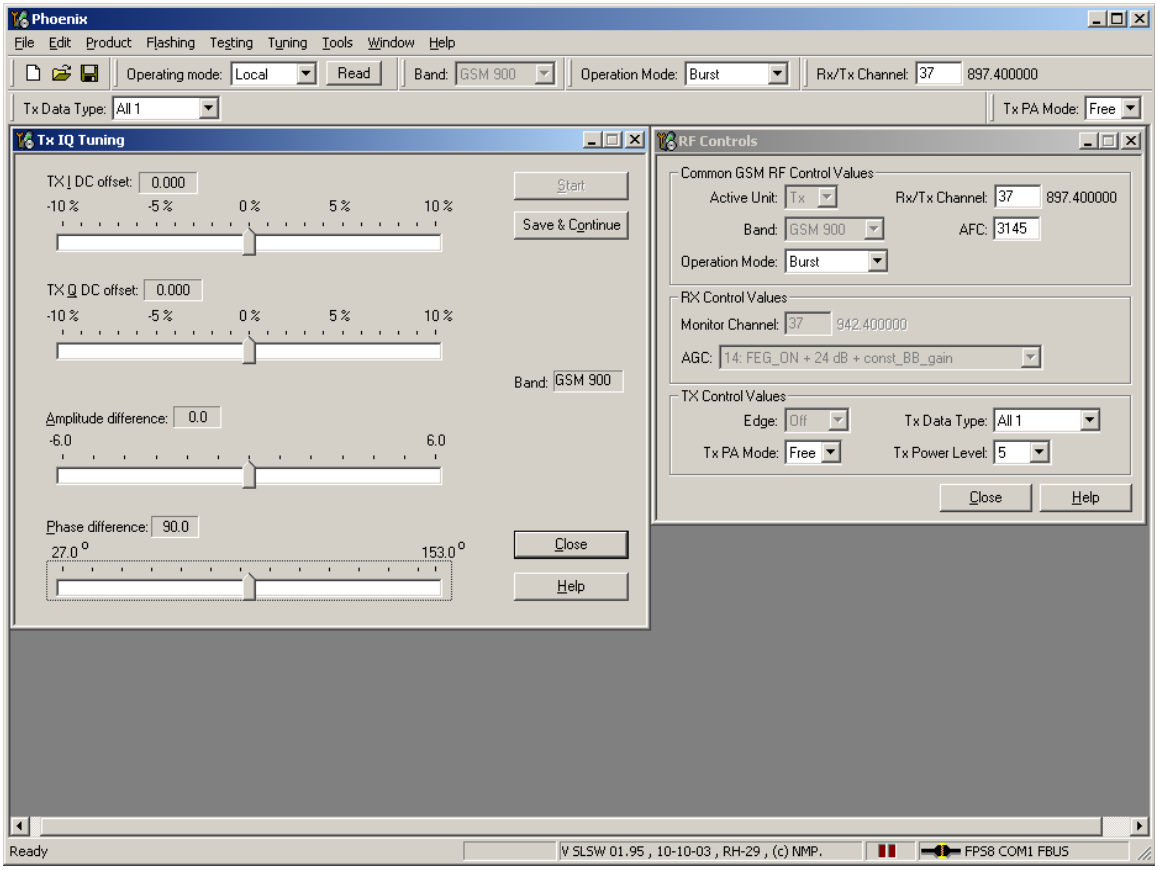
The setup should now look like this:



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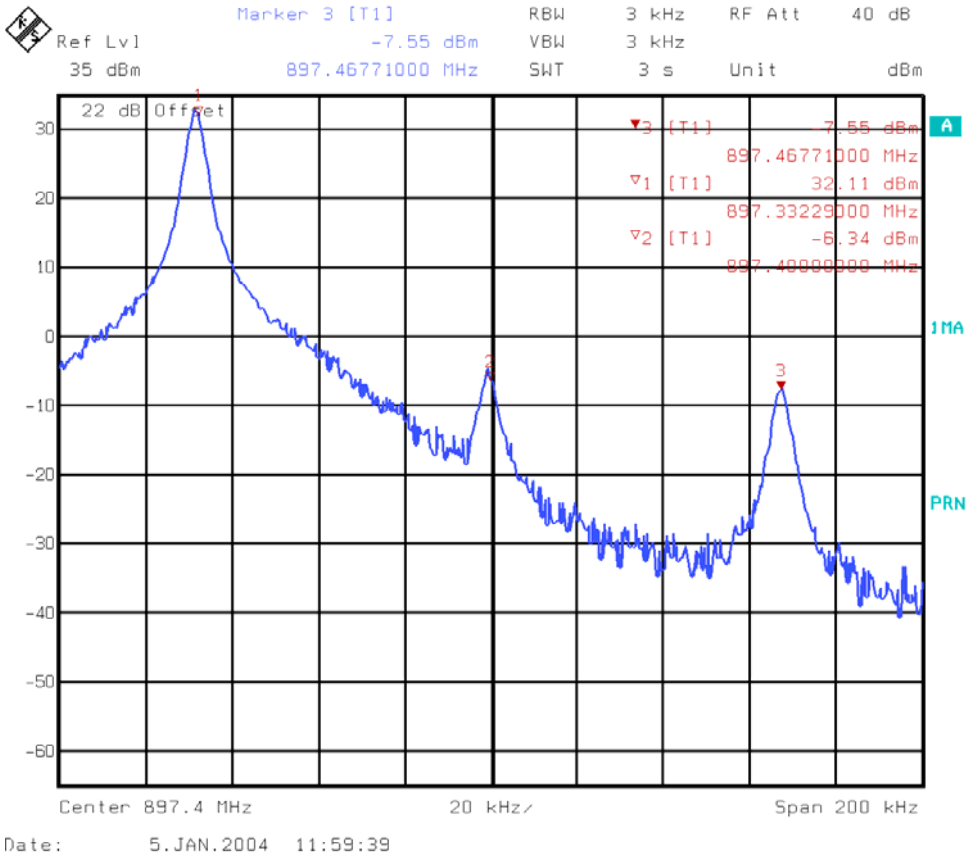
The Spectrum Analyzer now shows a plot like this:



The purpose of this tuning is to tune the carrier signal and the +67kHz signal to a minimum level (Marker 2 and 3).

Use the variables 'TX I DC offset' and 'TX Q DC offset' to adjust the carrier signal to a minimum level (Marker 2).

After tuning to the minimum the level difference between the peak levels at marker 1 and 2 must exceed 40dB.

Tuning is possible by using arrow keys on the keyboard. Pushing the sliders by using the mouse is less sensitive but even possible.

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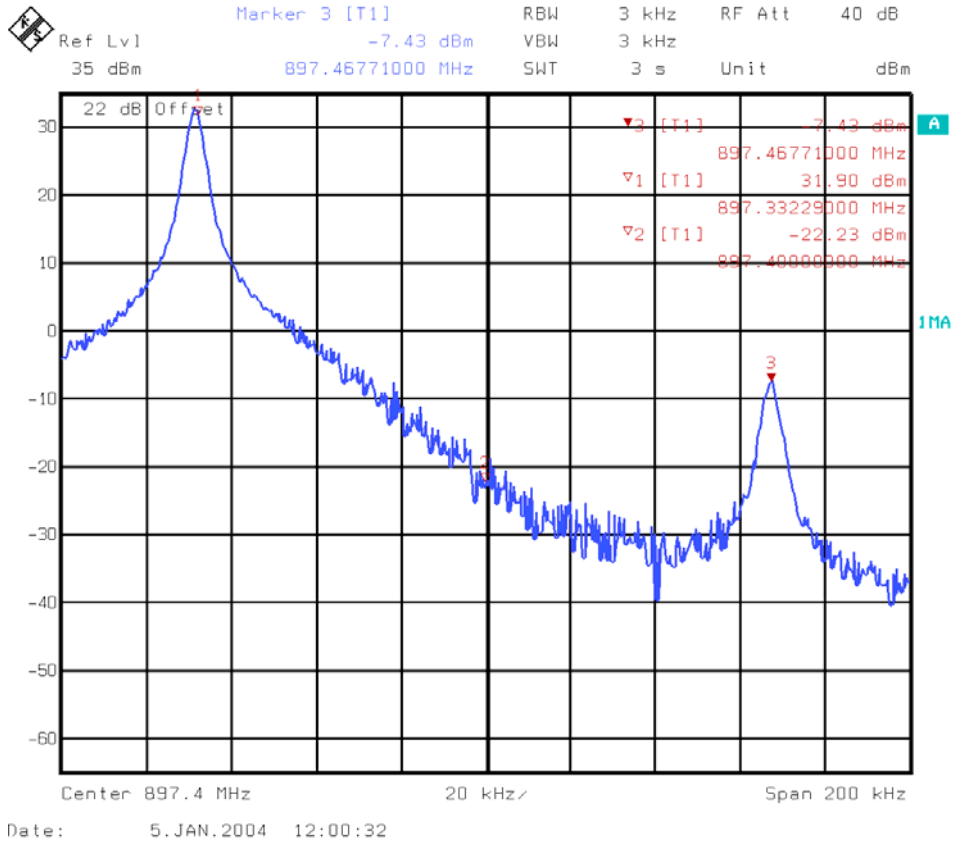
The Spectrum Analyzer now shows a plot like this:



Use the variables 'Amplitude difference' and 'Phase difference' to adjust the +67kHz signal to a minimum level (Marker 3). After tuning to the minimum the level difference between the peak levels at marker 1 and 3 must exceed 40dB. Tuning is possible by using arrow keys on the keyboard. Pushing the sliders by using the mouse is less sensitive but even possible.

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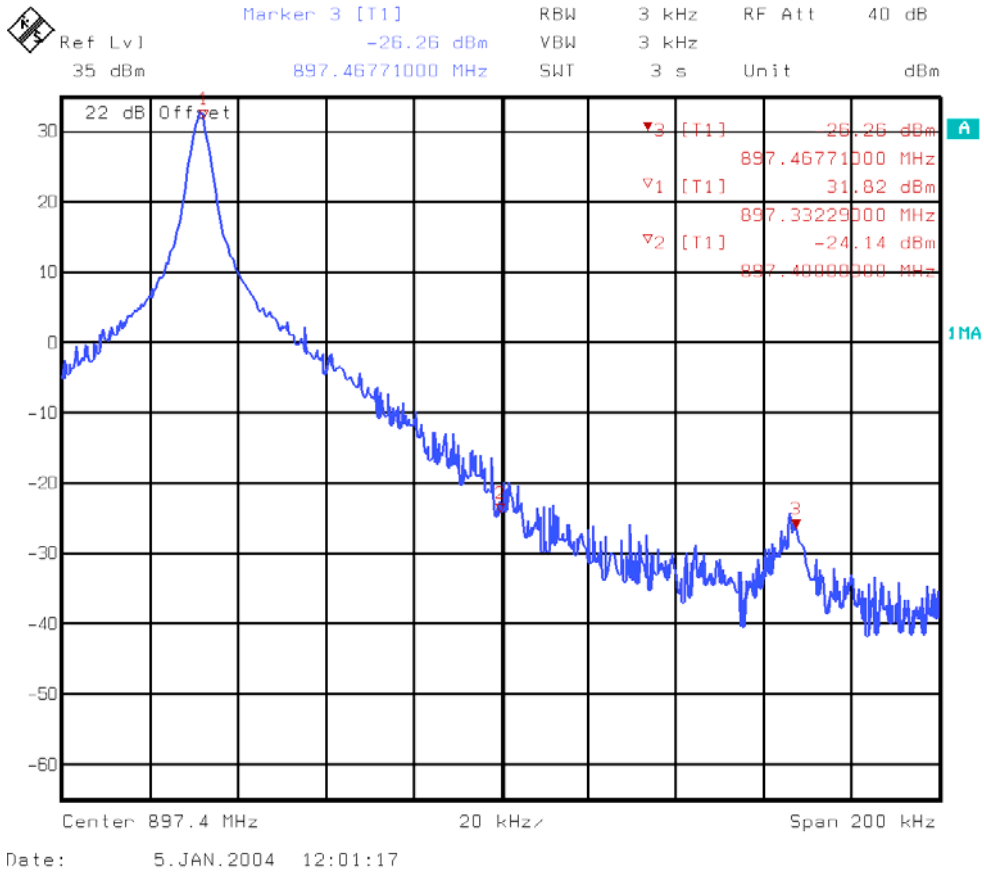
The Spectrum Analyzer now shows a plot like this:



Select again in the RF Controls Window:

Select "Save and Continue"

Press Stop and the values are stored in the phone.

The EGSM TX IQ Tuning is now finished and tuning continues in the DCS1800 band.

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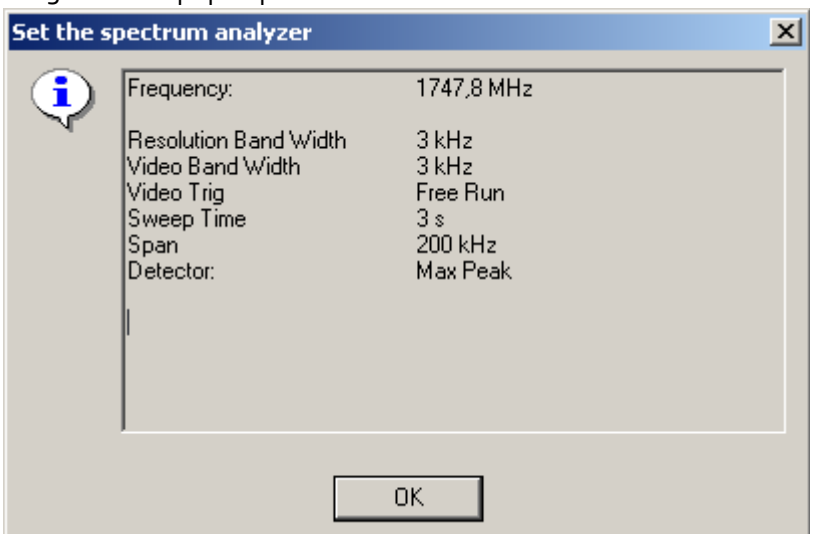
DCS1800

If a spectrum analyzer is used then use the following settings.

Table 4:

	DCS1800
Center Frequency	1880 MHz
Frequency Span	200 kHz
Resolution Bandwidth	3 kHz
Video Bandwidth	3 kHz
Sweep Time	3 sec.
Sweep Type	Clear/Write
Detector Type	Max Peak
Reference level	35 dBm
Marker 1	1747.73229 MHz
Marker 2	1747.8 MHz
Marker 3	1747.86771 MHz

The following window pops up:



Select in the RF Controls Window:

Select TX Power Level 0

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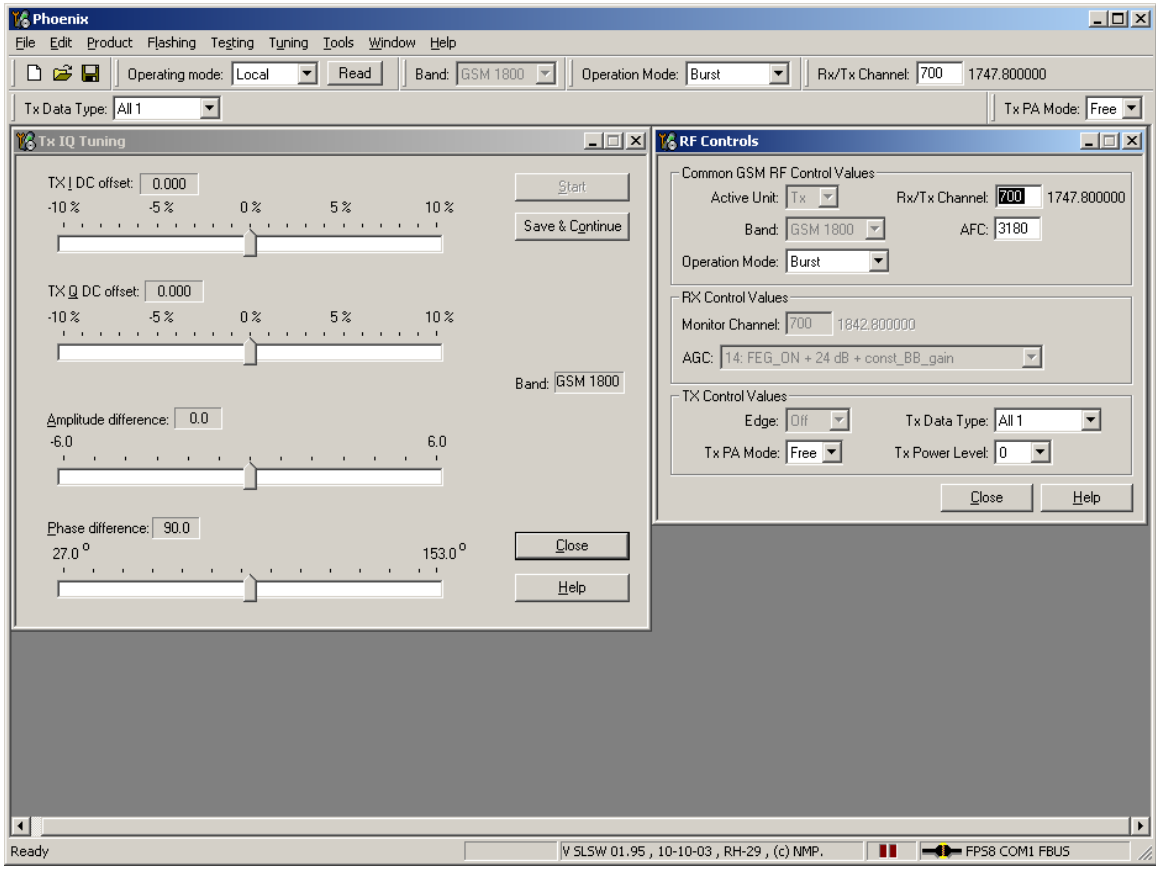
The setup should now look like this:



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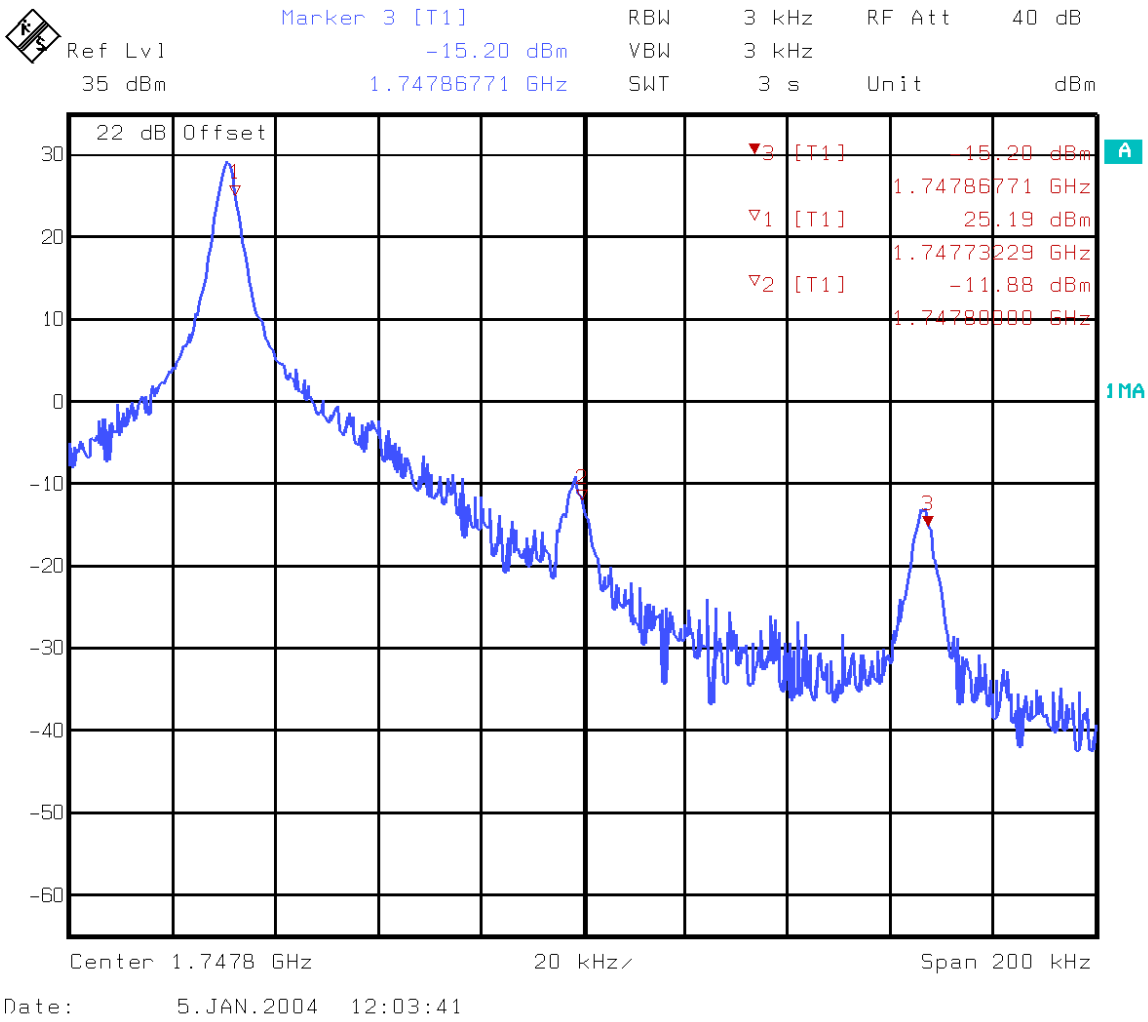
The Spectrum Analyzer now shows a plot like this:



The purpose of this tuning is to tune the carrier signal and the +67kHz signal to a minimum level (Marker 2 and 3).

Use the variables 'TX I DC offset' and 'TX Q DC offset' to adjust the carrier signal to a minimum level (Marker 2).

After tuning to the minimum the level difference between the peak levels at marker 1 and 2 must exceed 40dB.

Tuning is possible by using arrow keys on the keyboard. Pushing the sliders by using the mouse is less sensitive but even possible.

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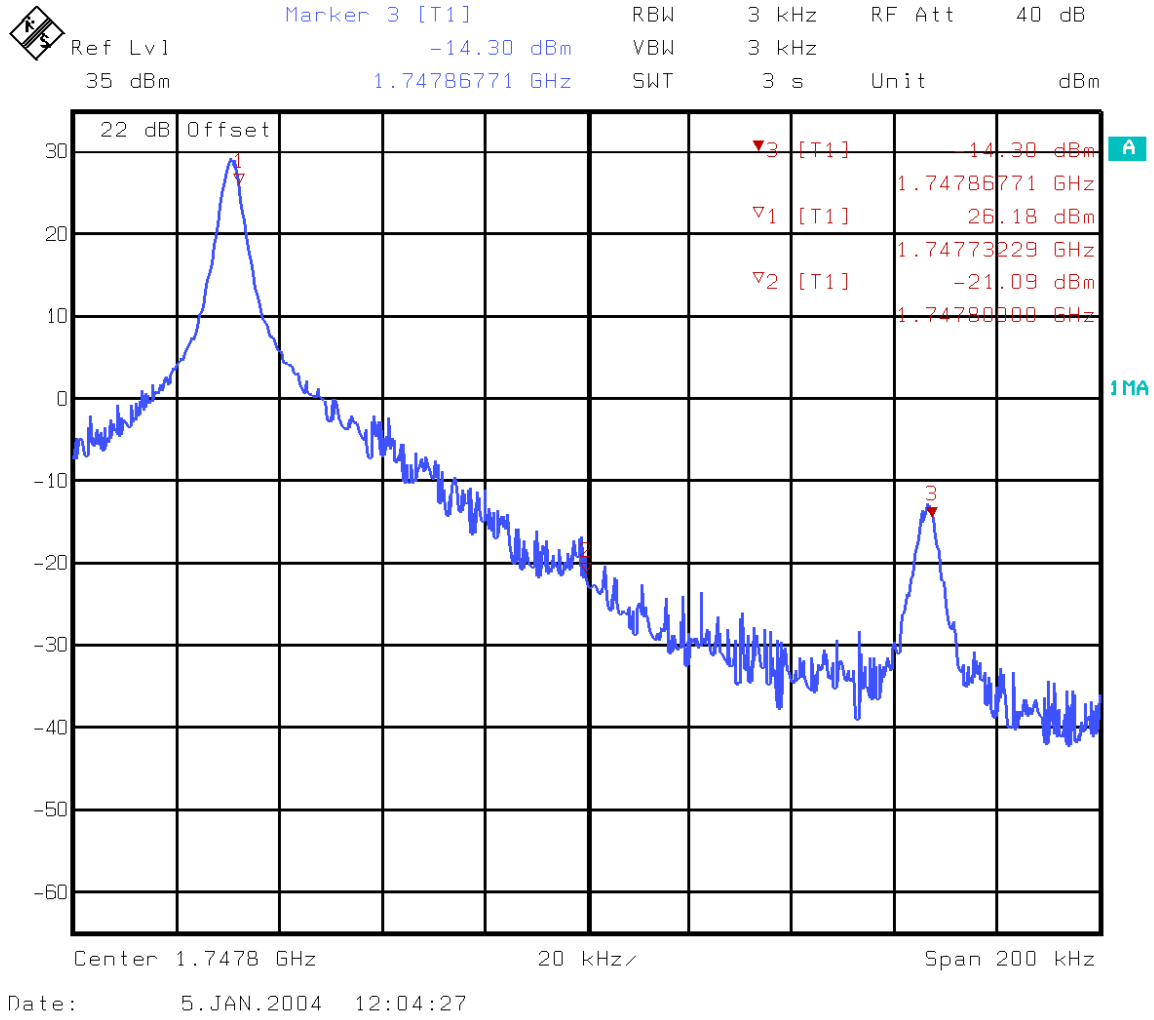
The Spectrum Analyzer now shows a plot like this:



Use the variables 'Amplitude difference' and Phase difference' to adjust the +67KHz signal to a minimum level (Marker 3). After tuning to the minimum the level difference between the peak levels at marker 1 and 3 must exceed 40dB, Tuning is possible by using arrow keys on the keyboard. Pushing the sliders by using the mouse is less sensitive but even possible'

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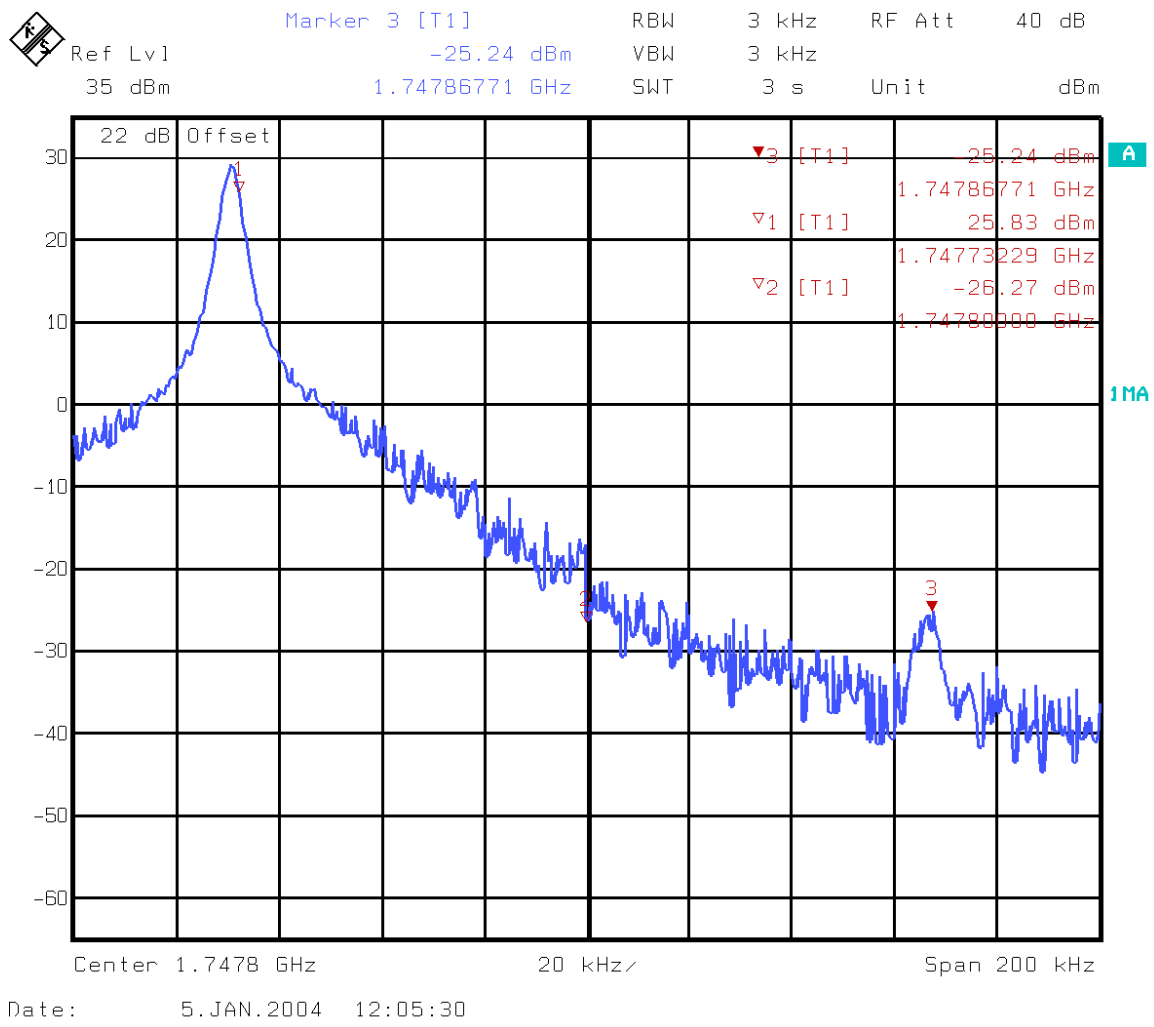
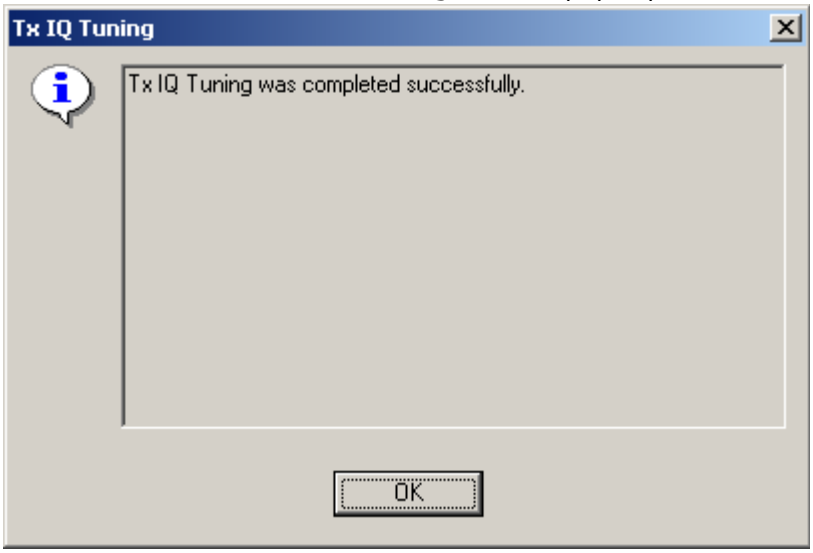
The Spectrum Analyzer now shows a plot like this:



Press "Save and Continue" and the following window pops up:



Now the TX IQ tuning has been finished.

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Note: the optimal values for "TX I and Q Offset" and "Amplitude and Phase Difference" vary from phone to phone.

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TX power tuning

This tuning must be done in both bands.

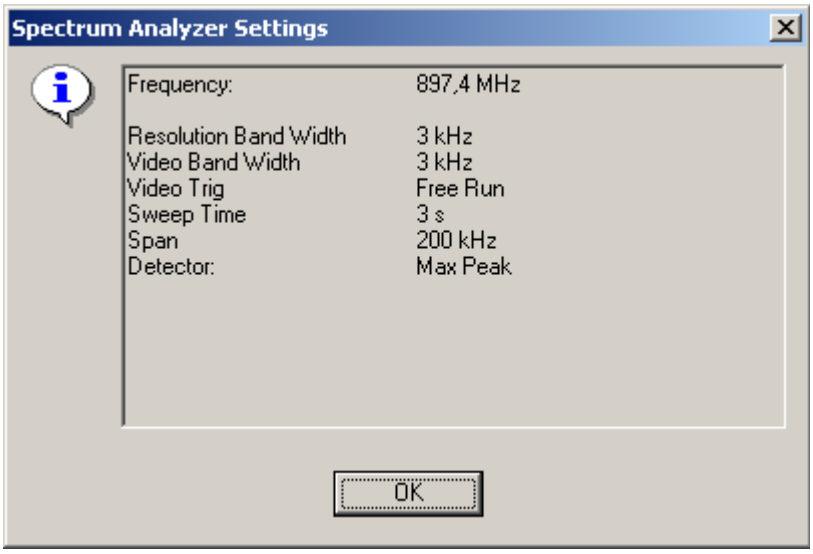
Note: TX Power tuning must be done with a peak power meter, e.g. Anritsu model ML2408A with Anritsu Peak Power Sensor MA2442A and a suitable attenuator. Tuning can also be done with a spectrum analyzer.

The use of power meter in GSM testers is likely to cause larger error than the use of a dedicated power meter and might cause the phone to be non-compliant with GSM specifications.

Connect a **calibrated** power meter to the RF connector of the phone.

Select	Testing	Alt-S	
	RF controls	R	
Select	Tuning		Alt-u
	TX Power Level Tuning		L
Select	Band	GSM900	
	Active Unit		TX

Press Start and the following window pops up:



If you are using a spectrum analyzer, make the necessary settings. Press OK to continue.

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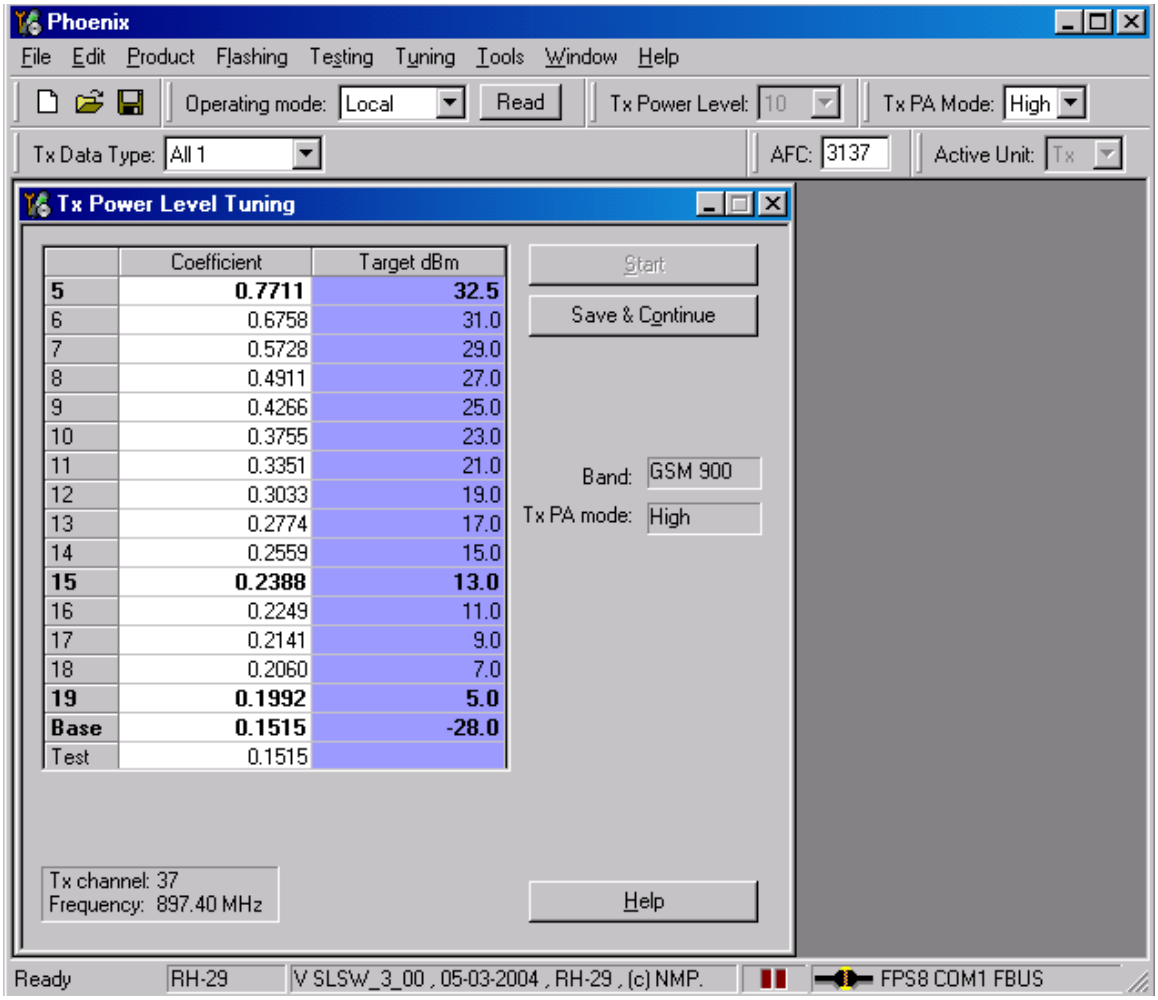
The setup should now look like this:



If you are using a spectrum analyzer, adjust the marker to the highest peak to see the power level.

Tune Base level to –30 dBm.

Adjust DAC Values for Power Level 5 (32.5 dBm), 15 (13 dBm) and 19 (5 dBm) according to Target values. The Power levels may differ from Phoenix mentioned target power levels.

Press "Save and Continue" and the tuning continues with DCS1800 power level tuning.

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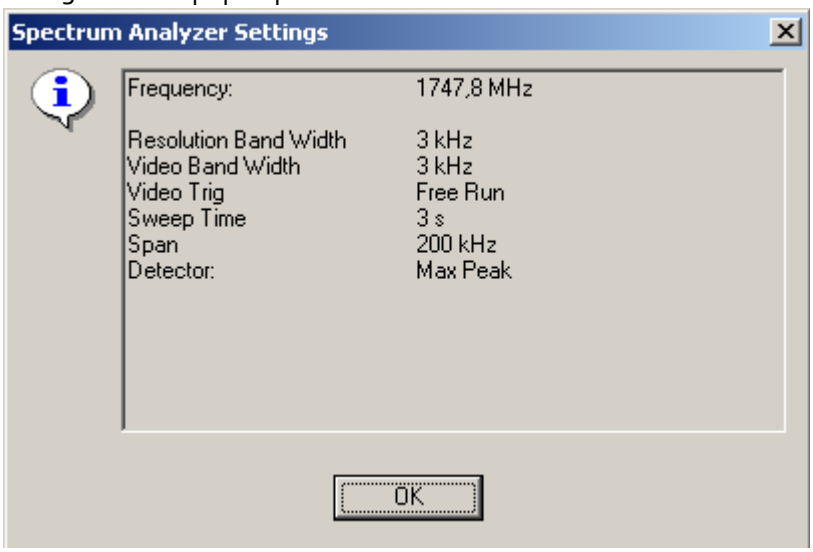
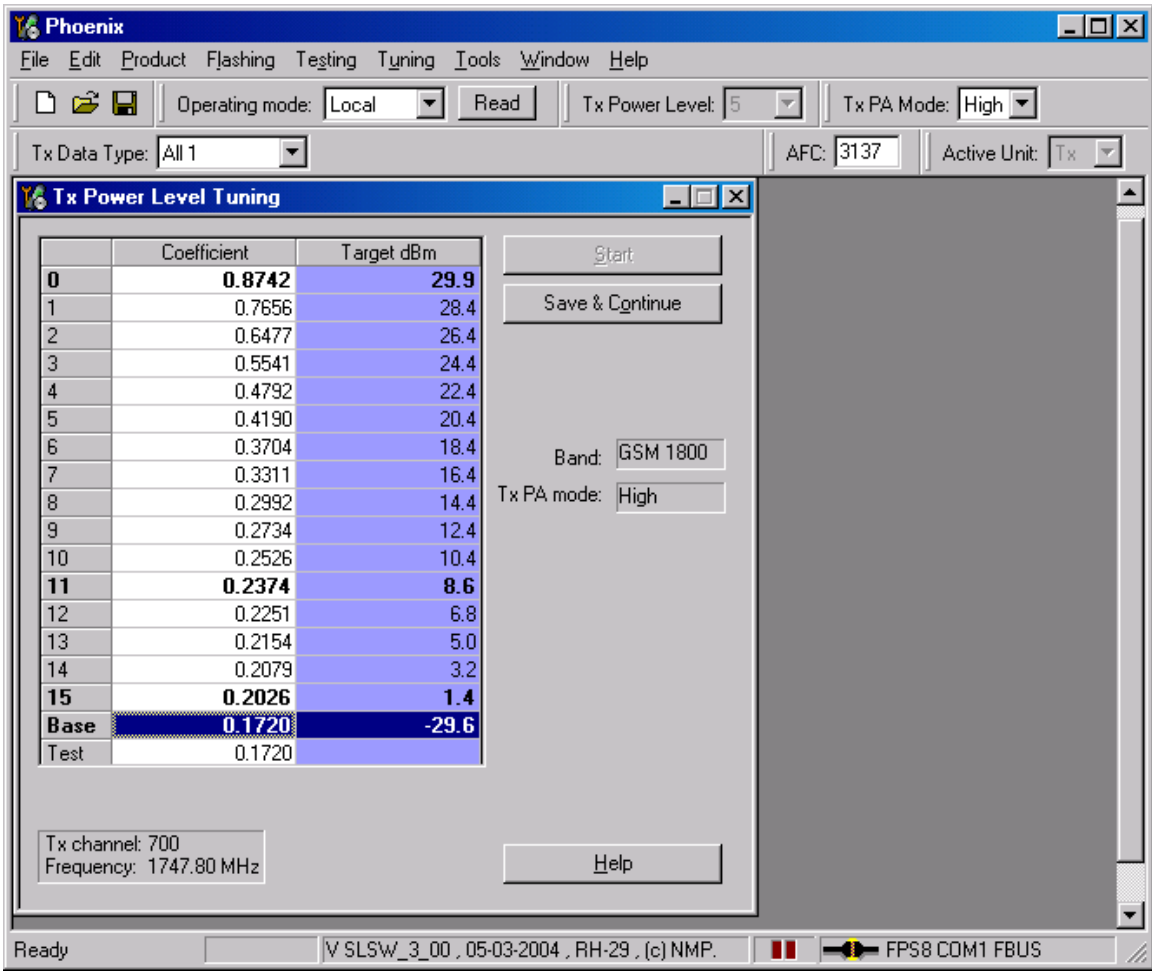
The following window pops up:



If you are using a spectrum analyzer, make the necessary settings. Press OK to continue. The setup should now look like this:



Tune Base level to -28dBm.

Adjust DAC Values for Power Level 0 (29.9dBm), 11 (8.6dBm) and 15 (1.5dBm). The Power

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levels may differ from target power levels mentioned in Phoenix.

Press "Save and Continue" and TX Power Level Tuning is finished.

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Bit Error Rate Testing with JBT-9

Hardware needed to use JBT-9

- JBT-9 Bluetooth test box
- SMA stub antenna (part of sales kit)
- ACP-8x charger (x denotes region, e.g. ACP-8E for Europe)

Use of JBT-9 stand-alone

The JBT-9 Box can be used **without** any PC connection as loop-back device for BT testing. To verify the products BT functionality, a Bit Error Rate test needs to be performed against JBT-9. The test is controlled and executed by Phoenix service software.

Attenuation settings

The JBT-9 attenuation is used to reduce the BT RF range. The default factory setting of internal attenuation results in a level of –36dBm (refer to chapter 5). This reduces the typical RF range to less than **0.5 m**. In case that distance is too short to perform tests over the air, the internal attenuation can be changed as described in the JBT-9 sales package user guide.

In case a service jig is directly connected to the box SMA RF I/O connector, it is recommended to work with the maximum internal attenuation (default factory setting).

Performing BER test

Connect service jig's BT RF cable to JBT-9's RF/IO connector. Optional with DA-17 the JBT-9 stub antenna can be used instead of cable.

Connect ACP-8x charger to JBT-9 power connector.

Make sure that distance between phone and JBT-9 does not exceed 0.3 m distance when using default attenuation setting.

BER test result is OK when BER is less than 0.1%

Note that the phone connection to the PC is specific to the tested phone. For details refer to the related chapter in the service manual.

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Setups for BER testing

Figure 5: BER test with DA-17

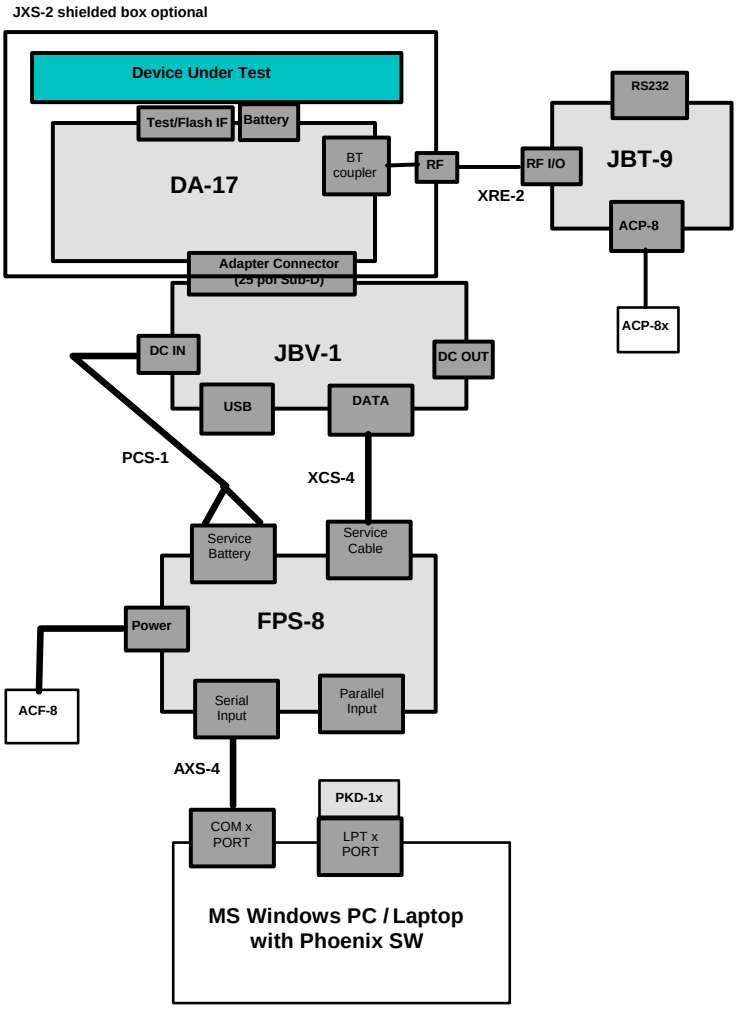

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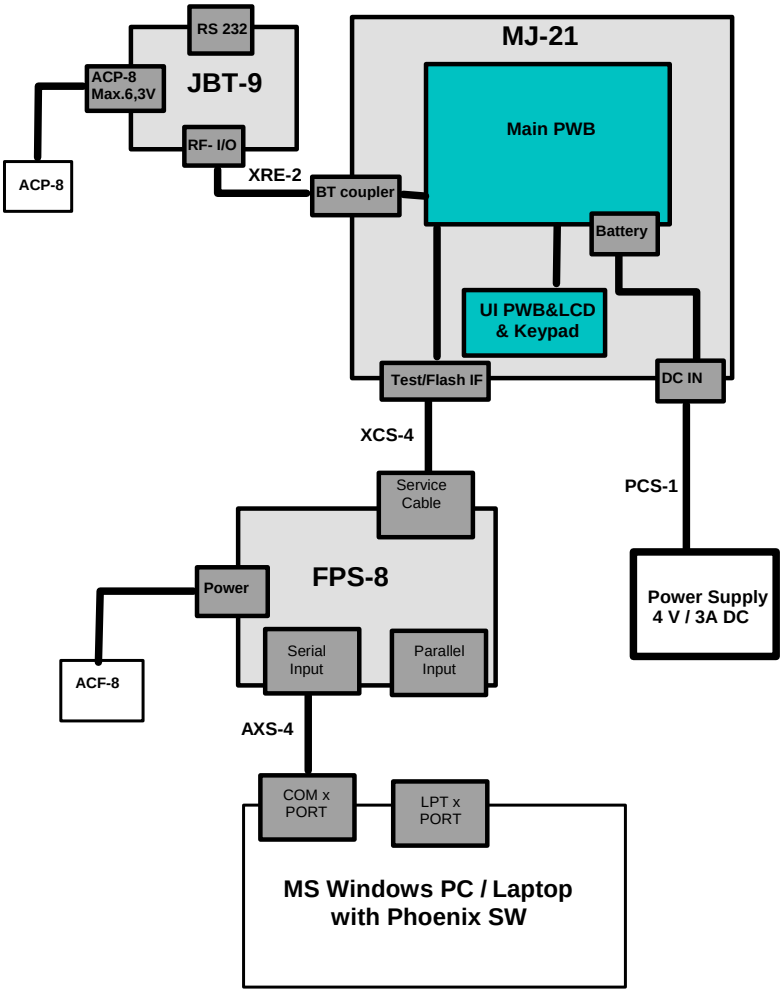
Figure 6: BER test with DA-17



Testing instructions for BER testing

Make sure that the phone's product support modules are properly loaded by Phoenix SW.

Set phone into Operating mode "TEST".

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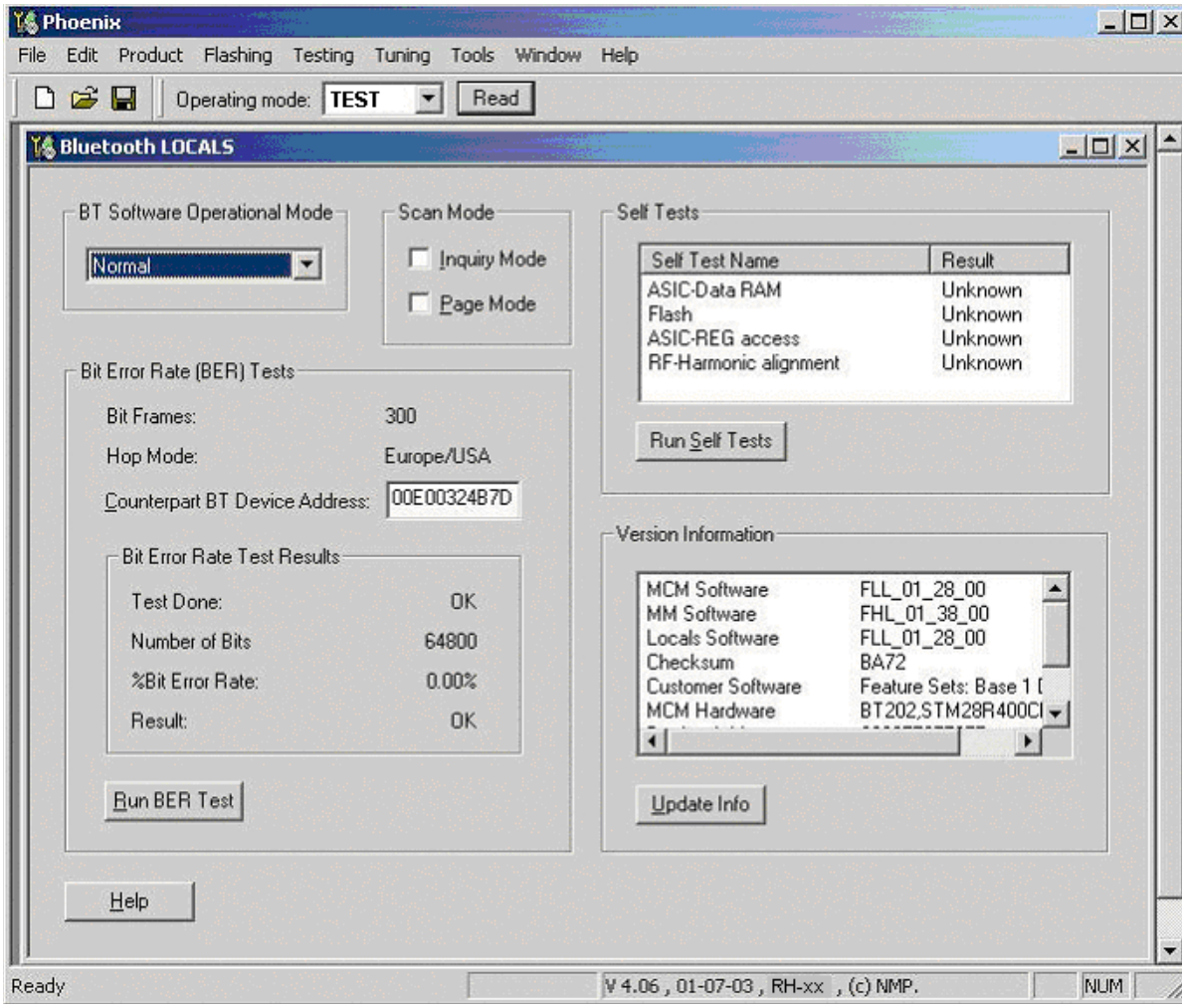
Choose "Testing" and "Bluetooth Locals".



Enter JBT-9's Ser.No. (12 digits from the type label) in the field "Counterpart Device Address". This has only to be done once as long as JBT-9 will not be changed!

Standard testing parameters as bit frames, hopping mode and number of bits are default settings by Phoenix. BT Software Operational Mode = Normal Mode.

Press the "Run BER Test" button to perform the BER test.

"Test done" means that test has successfully been performed; if Bit Error Rate is </= 0.1% the "Result" will be also displayed as "OK".

Additional menu functions

BT MCM related self-tests can be performed by pressing "Run Self Tests". Result has to be "OK"

The "Version Information" dialog gives you BT MCM related detail information that could be necessary in case of detailed fault reporting.

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Other settings such as "Scan Mode" or "BT Software Operational Mode" are only necessary to change in case of special device analysis in combination with e.g. commercial BT test systems.

Attenuation setting via jumper

Internal possible settings after JBT-9 boot-up are listed below. The precision of the internal attenuation is specified to be +/- 5dBm. During test the attenuation can also be changed via Phoenix SW.

Attenuation	Typical output power (+/- 5dB)	GPP10	GPP11	RF range	Factory setting
14 dB	-21 dBm	Closed (GND)	Open	< 1,5 m	
14 dB	-21 dBm	Open	Closed (GND)	< 1,5 m	
0 dB	-7 dBm	Open	Open	< 8 m	
29 dB	-36 dBm	Closed (GND)	Closed (GND)	< 0,5 m	X

LED indication of JBT-9

ACTION	STATUS-LED	BER TEST-LED	FBUS-LED	POWER-LED
POWER				ON
FBUS			ON	
INQUIRY		BLINKING		
CONNECTED		ON		
BER-TEST		ON		
LOOP-BACK		ON		
ERROR	ON RED			
BOX READY	ON GREEN			

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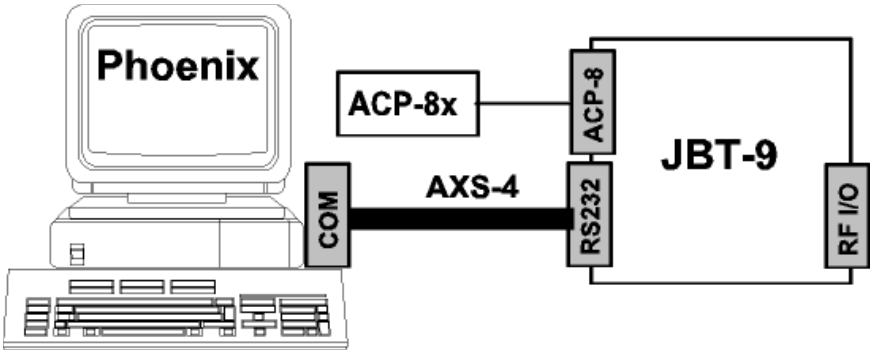
JBT-9 Firmware Upgrade

The JBT-9 Box SW can be updated by using the "Bluetooth Flasher" as part of PHOENIX service software.

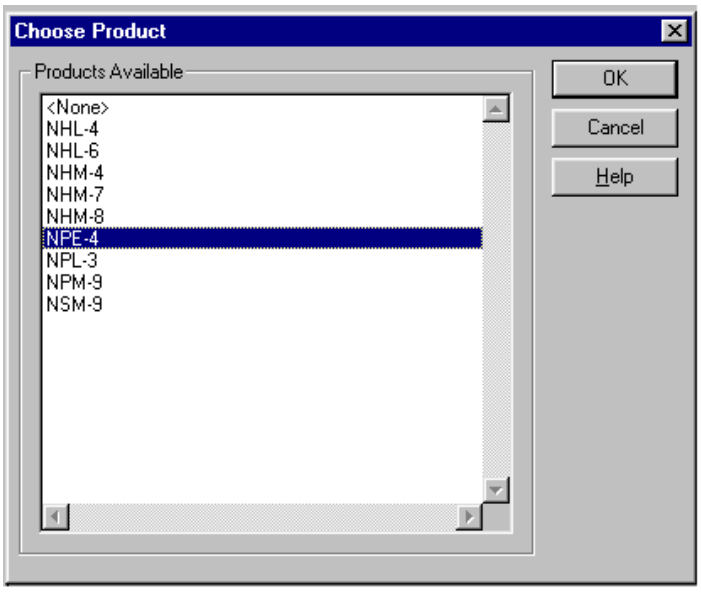
Prepare the equipment setup as shown in picture below:



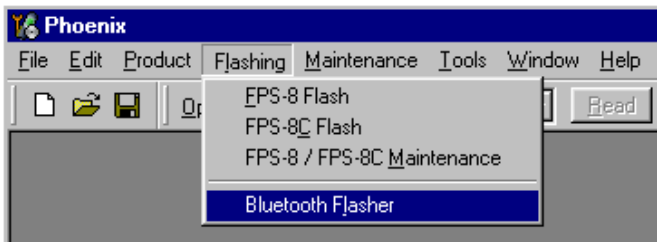
Start PHOENIX service software incl. installed PKD-1x dongle.

Make sure that in the actual selected connection is "NO CONNECTION".

Select any phone with Bluetooth MCM in "**Choose Product**" menu.



Open the "**Bluetooth Flasher**" as "**Flashing**" sub-menu.



Open the Select the correct "bin" file. Check the correct serial port (COM 1-4) port

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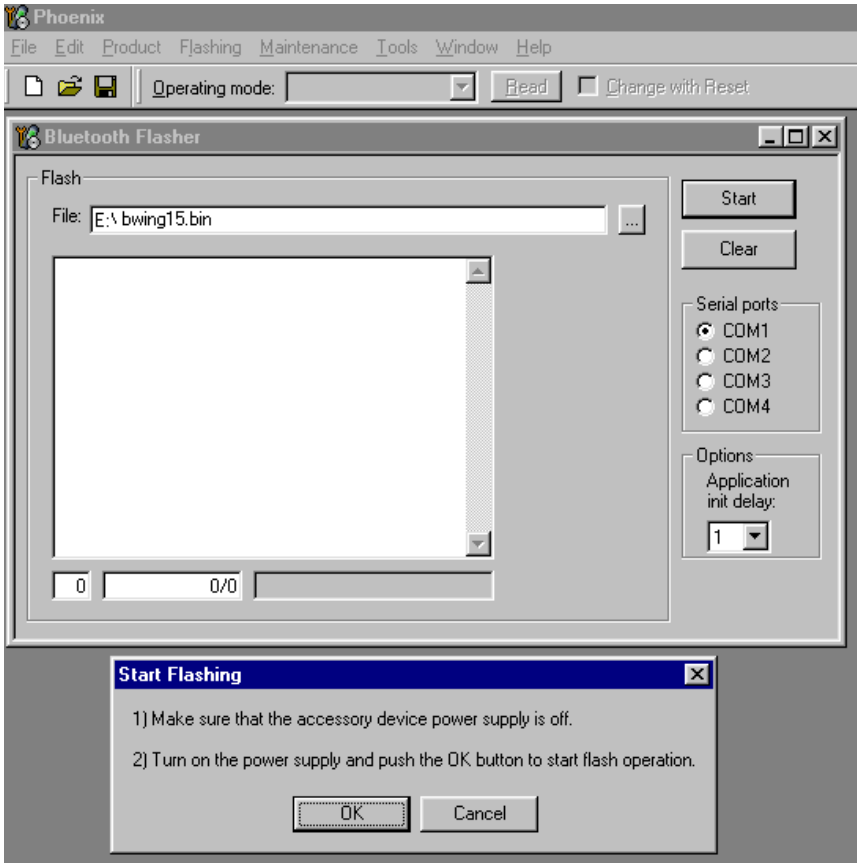
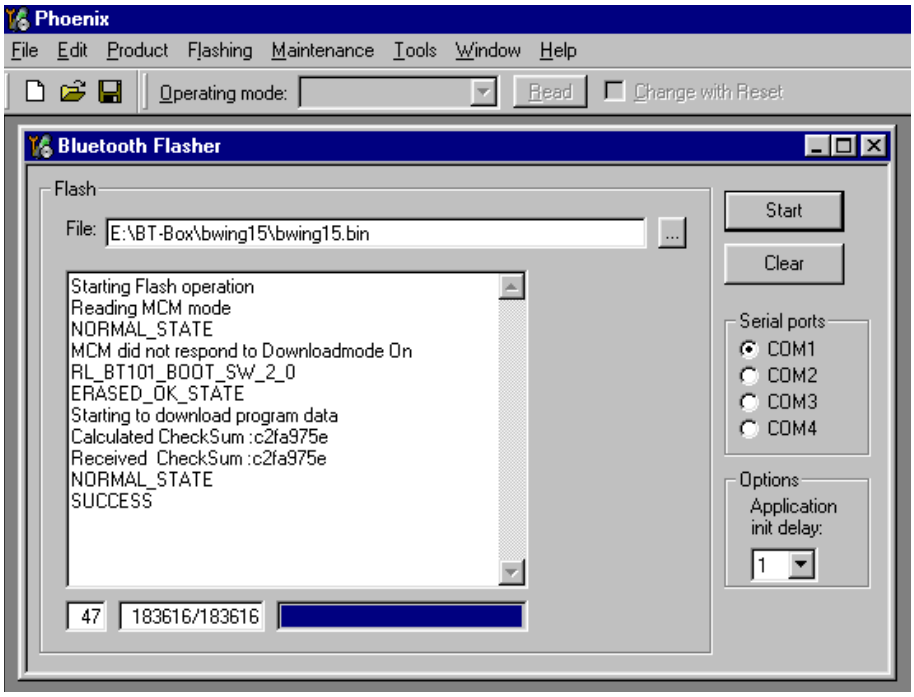
before. Press "**Start**" button and follow the pop-up menu.



Wait until you get the "SUCCESS" response in the activity-window. The error message "MCM did not respond to Download mode On" can be ignored.



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